# Telephony.

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# Pennsylvania Telephone Convention

FIRST DAY'S SESSION.

The second annual convention of the Pennsylvania State Independent Telephone Association was held at the Monongahela House, Pittsburg, Pa., November 9 and 10, 1905. The convention was called to order by Vice-President Griffith, who said:

"I take great pleasure in calling together the second annual convention of the Pennsylvania State Independent Telephone Association, and in introducing Mr. John A. Blair, who will deliver the opening address."

DELEGATES ATTENDING THE PENNSYLVANIA STATE TELEPHONE CONVENTION, PITTSBURG, NOVEMBER 9-10.

Mr. Blair, representing the mayor of Pittsburg, spoke as follows:

"I take great pleasure in welcoming you to the city. I understand that this is a convention of the Independent telephone companies of Pennsylvania, and I am sure that all who pay telephone rates will be very glad to see the Independent movement grow, and hope that it will grow stronger as time goes on—and know it will. Your Independent company here has shown great strides in the last few years.

"I suppose a great many of you are from different parts of the state, and we hope that while you are here with us you will take advantage of the facilities that are afforded you to see this city and this part of the state.

"Pittsburg is an old city, an historic city. It was here that the French first settled this territory, and this was one of their forts and part of their scheme in organizing the west from Montreal to New Orleans. And it was here that Washington first made himself known as a general. This, as you all know, is one of the greatest manufacturing districts of the world. Probably more tonnage is taken away from this territory than from any other territory of equal size in the world.

"If you will, before you go away, visit the different parts of the city and surrounding towns and territory here, you will become convinced of this. The Monongahela river, from a point up above McKeesport, is lined with manufactories, and so is the Allegheny—clear up almost to Freeport; besides all the manufactories throughout the city.

"Now, I didn't come here to make a speech to you. I just came very unexpectedly—was told to come down here and welcome you to our city. And I do so most heartily,

hoping that you will have a pleasant time while you are here."

Mr. Griffith thanked Mr. Blair on behalf of the association and introduced Hon. J. S. Weller, who, in responding to Mr. Blair's address of welcome, said:

MR. WELLER'S RESPONSE.

Possibly the only excuse that I can offer for attempting to respond to the hearty welcome accorded to us by the representative of the administration, is to give expression to a sentiment that filled the Independent interests from the very moment this place had been selected at Harrisburg as the place of meeting for the next convention.

As Pittsburg is spoken of, it is generally hospitable to conventions and to representatives visiting this community for the purpose of studying industrial questions; even those who come here out of curiosity, as well as those who hope to improve their conditions, wherever they may come from. It is true that this is possibly the most important industrial center in the entire world. The tonnage of Pittsburg exceeds that of five of the largest cities in the world, combined.

Pittsburg and its people are noted for their progressiveness, for their enterprise, for their broad gauge spirit, public spirit, and for the skill and ability which abounds here to a very great extent.

I only know the telephone question from a general point of view, and it might not be amiss to say just a few words in that connection, speaking of the situation generally, and possibly a word or two with regard to the situation in Pennsylvania.

There possibly has never been an undertaking that faced such obstacles and discouragement at its inception as the Independent telephone business. The Bell Telephone Company controlled the inventions; it had had twenty years within which to intrench itself in this country; and in every particular controlled the telephone field almost exclusively, five years ago.

But, notwithstanding that, during the last five years, the Independent telephone business has extended until it is fairly well established in nearly all of the villages, hamlets, towns and cities, of all the states and territories. I dare say that the number of Independent telephone stations in the United States at the present time largely exceeds that of the Bell. In the middle west, the Indepndent telephone companies unquestionably have the advantage. And this has nearly all been done within the last five years.

In Pennsylvania, renowned for its position as a great industrial state, the Independents have not been quite as progressive as they might have been. But that has been due largely to the physical condition of the state. Construction is very expensive here, on account of our hills and mountains; and we are somewhat impeded in progress by reason of the ungenerous laws that compel us to confine our construction to the highways, unless we can buy the private right of way from the owner. Notwithstanding that, there is hardly a village in Pennsylvania, and there is no city, that does not have a telephone plant of standard and modern equipment. And it will be but a short time, possibly within a year, that all of these local telephone plants will serve, as pegs upon which a great long distance telephone system will be suspended.

One of the great discouragements met with by the Independent telephone interests, was the financial question,—the attitude of the financial interests of the country towards the Independent telephone movement. But just as the street railways have brought the financial interests to look upon their enterprises favorably, and the water interests—in fact, all the public facilities, so surely will the Independent telephone interests be able to obtain a friendly feeling and co-operation from the financial interests of the country.

I was told just a few minutes ago that the Keystone Telephone Company, of Philadelphia, sold something like $4,000,000 of bonds through one of the most reputable brokers in the city of New York; and that firm of brokers agreed, within ten years, to raise $6,000,000 more. Now, it is a very encouraging sign when a reputable broker will take hold of a security of that sort and demonstrate to his clients that it is a good security. And when we bring the financial interests to know, what is a fact, that telephone security is as good as any other security, there is not the slightest doubt that the Independent telephone interests of this country will surpass those of the Bell many fold.

The Bell company has endeavored, at least publicly, to ignore the Independent's strength until quite recently, when we had a notable example down here in our own territory, where the Bell, discarding its past policy, undertook to make a long distance connection with the Waynesburg Independent plant, upon consideration that the Bell go out of business locally in that community. So that they are evidently beginning to appreciate the Independent and their power in the community, when they will recognize a plant in one of our smallest communities.

We have the skill, and that is demonstrated by the numerous places that I could point to where the Bell company has offered larger salaries to the employes of Indendent companies, thereby recognizing that all of the engineering skill is not reposed in the Bell company.

I am quite certain that I voice the sentiments of this convention and every member of it, when I say that we appreciate the very, very warm welcome extended to us by a representative of the administration of this city, and we can send word back to the mayor that he will not be required to put on extra policemen to keep the peace.

After Mr. Weller's address the chairman of committee on credentials made his report, after which Mr. C. E. Wilson, chairman of committee on nominations reported as follows:

"Your committee on nominations appointed at the executive committee meeting held this morning respectfully beg to make the following nominations for the respective offices of the association:

President, C. W. Kline, Hazleton; vice-president, Chas. Griffith, Johnstown; vice-president, Jas. Collins Jones, Philadelphia; secretary, H. E. Bradley, Philadelphia; treasurer, C. E. Wilson, Philadelphia. Executive committee: J. G. Splane, Pittsburg; C. E. Wilson, Philadelphia; R. E. Umbel, Uniontown; Chas. West, Allentown; Edward Davis, Philadelphia; E. D. Schade, Johnstown, F. D. Houck, Harrisburg; W. B. Trask, Erie; G. B. Rudy, York.

The election of the foregoing was unanimous.

After the election of officers Mr. Wilson of Philadelphia said he understood there were a number of prominent telephone men from the West who would arrive later in the day, and in order that they might have an opportunity to hear the discussions in full and whatever papers were to be presented, moved the convention adjourn for the day, which was carried.

SECOND DAY'S SESSION.

The first thing in order at the beginning of the second day's session was the report of the committee on resolutions on the death of Vice-President Barnard. Mr. Weller, chairman of that committee, made the following report:

Whereas, It has pleased Divine Providence to remove from our midst and from his earthly labors, William D. Barnard; and,

Whereas, His skill and efforts in the field of Independent telephone development distinguished him as one of the foremost men in his profession: therefore,

Resolved, That the Pennsylvania State Independent Telephone Association, in convention assembled, give expression to the great loss it and the Independent telephone industry generally has sustained in the death of our colleague and co-worker, whose qualities of heart and mind endeared him to all who came in contact with him.

Resolved, That in William D. Barnard, we found all the attributes of good citizenship, the successful man in the public affairs with which he was identified, in private life, all the sterling qualities of a God-fearing, public-spirited, home-loving, manly man.

Resolved, That his skill and energy in the Independent telephone field and his clean private life have erected for him in the hearts of his associates a monument more enduring than words, and more lasting than any tablet that can be erected by mankind.

Resolved, That the loss to the Independent telephone industry is irreparable, the loss to his friends and family the greatest they could sustain; and we, the members of this association surviving, tender our condolence to the bereaved family and direct that a copy of these resolutions be forwarded to the family of the deceased.

On behalf of the committee, I move the adoption of these resolutions, and that they be spread on our minutes and a copy thereof be forwarded to the family as provided by the resolution.

Motion duly seconded and unanimously passed.

Following the resolutions, Mr. Charles West, of Allentown, read a paper on "The Future of the Independent Telephone Movement," which follows:

MR. WEST'S PAPER.

Although this paper is to treat primarily with the future of the Independent Telephone movement, it will perhaps be well to begin with a brief history of the starting of the Independent movement. You are all familiar with the original telephone invention of A. G. Bell, and I personally remember the wonder the instrument caused when first exhibited at the Electrical Exhibition held at the Crystal Palace, in England, some twenty-five years ago.

For many years the great "Bell" monopoly, through its basic patents, controlled the entire telephone situation, charging outrageous prices for poor service, with inadequate apparatus and practically had the entire population of telephone users in the hollow of its hand.

The tactics pursued by the Bell company at that time naturally were objected to by the enlightened people of this country, and they

in time began to cast about to find a remedy. For a long while they could see no ray of hope, and as the tendency was to charge higher prices and to dictate more onerous conditions, the public began to despair. But, "it is always darkest just before the dawn," and the day of salvation was at hand.

In a quiet and unostentatious way, various men of brains and genius had been quietly working out their plans and designing new and better apparatus, and when at last the patents owned and controlled by the Bell company expired, they were ready to proceed with their ideas, and there was started at that time the first Independent telephone company, which has risen by leaps and bounds into the present splendid organization, that we all present here represent and to which we are proud to belong.

The installation of the first Independent system was in the western part of this country, and in the east it is claimed by many towns; but so far as I am able to discover, the credit belongs to a little borough called "Honesdale," in Wayne county, in this great Commonwealth.

From that time on the industry has been steadily growing, until now practically every large city in the United States has or will have in the very near future its own Independent plant, with its feeders in the shape of toll lines running out into every little village and hamlet, and thus putting them in touch with their markets of supply. What a difference a few years has made. We have now up-to-date apparatus, central energy switchboards and far-reaching toll lines; but we must constantly be going forward, and that brings us up to the important matter before us, "The Future of the Independent Telephone Movement."

I do not wish to pose before this convention as a prophet, but I do think that we can take up some matters at this time that will be instructive and valuable to us all. It appears to me that we are not increasing our business in the east as rapidly as they are in the west, and one of the most important things for us to do is to educate the people to the value of the Independent telephone. This can be done in many ways, and nearly everybody has his own ideas on the best methods of doing this, such as advertising in various ways, free service, etc. We have some mighty convincing arguments on our side, one of which is the large excess of our telephones in use over the Bell company, resulting in the users of our service being able to reach a far larger number of people. Of course, we must realize the fact that at this time we cannot reach them all, which means that we must lose no time in building new, and extending our present toll lines, to weld all of the various systems into a complete unity, so that we can reach all of the people, north, south, east and west. We are all doing our share in this particular, but we must work together, hand in hand, "In unity there is strength," and a long pull and a pull all together is very necessary to accomplish the results that we are all aiming at.

A most important point, to my mind, is a "Universal Emblem" that we may all know. Everybody knows the "blue bell" stands for a monopolistic telephone, and we want everybody to know when they see a certain emblem that it represents an "Independent" telephone. At the last convention of the National Interstate Telephone Association, this was impressed very strongly upon the delegates, and after discussion an emblem was adopted, and I think that all companies should endeavor to install it at an early date.

The large companies throughout the state should endeavor to get the small companies to build their lines properly, so as to give good service and should make a strenuous effort to get the small rural lines to connect with them; for while the returns may be small, we must recollect that every new point we reach helps us to get new subscribers in the large towns and means an increase of toll business.

It seems to me that all Independent companies must look to the toll revenue for their surplus earnings, as the present low rates for subscribers' service do not leave enough margin over and above the cost of operation, maintenance and depreciation to pay many large dividends; therefore special and earnest efforts to increase this part of the business should be made and inducements offered to the subscribers so as to get them to use the service.

Coupon books at attractive rates of discounts can be prepared, good in any Independent territory and accepted by any Independent company in payment of long distance messages, and I am sure this will be a great inducement to large concerns. Many of the companies represented at this convention are now issuing these books and are getting good returns.

I am of the opinion that it will not be long before telephone service is placed upon the same plane as gas and electricity, that is, the measured service basis. The sale of electricity by contract is almost a thing of the past, and when a satisfactory telephone service meter is perfected, telephone service can be sold very much along the same lines, and in that event there is no reason why practically very household should not have a telephone installed.

There are a great many other matters that could be brought up at this time, but every company has its own methods of producing and increasing business and we are all working together for the common welfare, and an interchange of ideas from time to time would be of benefit to all.

In conclusion, I think it must be clear to all that this splendid state of Pennsylvania, with its enormous natural resources of hard and soft coal, oil fields, iron mines, cement mills, slate quarries, and numberless manufacturing industries, is destined to become one of the largest users of Independent telephone service in the country, and we should all earnestly strive to make the individual companies we represent an important factor in the development of the territory, and help to make the "Future of the Independent Telephone Movement" an assured success.

After the discussion on Mr. West's paper, Mr. J. Walter Barnes, of Fairmont, W. Va., made the following remarks:

"West Virginia occupies just now a unique position regarding Pennsylvania. We were getting very good service from Fairmont and from the central part of West Virginia, connecting up with Pennsylvania in a very good way, until we met a condition in the state that has blocked us all. And one of the things that we are anxious for the Pennsylvania association to do is to connect us up again.

"I took this up with the gentleman who had charge of the South Penn Telephone Company, and he said, 'Why, I think I can make arrangements whereby you can get into the Central District and Printing Telegraph Company and have connection with Pittsburg and Wheeling through the Bell line.' I said to him, 'My dear sir, the business in West Virginia and the Consolidated Telephone Company was built up in opposition to the Bell Telephone Company; and, while we might make as much money and more if we could get this sub-license,' I said to him, 'We cannot in that way go in as a sub-license to the Bell.' There is in us that sense of independence, and we cannot and will not be ground down by monopoly.

"I want to say for West Virginia that we are making progress, and we look to a connection in a short time that will be a very great improvement over the one we have had, and we look for something better; and I believe we are moving on and making gains all the while over the Bell."

Mr. J. G. Splane, president of the Pittsburg and Allegheny Telephone Company was the next speaker. Mr. Splane said:

"Some of the gentlemen present who have been scouting around through the city would be in a better position to impart information. About all I can say is that matters in the Pittsburg district have been progressing very favorably; that we have been growing right along; that the principal thing that remains to be done is the interconnecting of all the Independent companies in the surrounding country, and later on the interconnecting of all the Independent companies. Negotiations are now under way which we hope will be consummated, by which within the next few years we will see in the United States a long-distance system equal to, if not the superior of, the present American Bell. When that time comes, I think the greater part of our labors will be over. We will then have met the request of the public for long-distance service. While probably not over twenty-five per cent of the telephone users of the United States use long-distance service, yet all seem to think that they want it, in case they do require it. The way matters are progressing, it will not be very long until we will be able to meet all their wants."

Following Mr. Splane, Professor J. C. Kelsey, of Chicago, spoke of the advantages of measured service and cited the proposed Milwaukee franchise as an example. He spoke of Independent progress throughout the country, and said he did not think the Independent people had reason to be afraid of anything that the Bell company could do at any stage of the game.

Mr. Edward Davis, of Philadelphia, who followed Prof. Kelsey said:

"I would like to just say one word on the question of long-distance business. Right here in every question and from every telephone man that I meet with, a sort of bugaboo is thrown into your face, 'You haven't any long-distance service.'

"I would just like to call your attention and let you go back to the time when you built your first plant. When you

began your business you had no long-distance connection. You didn't have a connection outside of five miles from the center where you built that plant. As you went along, you added telephones, you increased your business, you gradually put out little lines here and there; and the question was always put to you, 'When are you going to get long distance connections.' The fact that you did not have long-distance connections did not stop your growth. You went steadily forward and added telephones to your plant and increased your income.

"Now, do not be frightened at this bugaboo of long-distance connection. The telephone proposition to-day is to give good local service. Put your switchboards in good condition, then put your service in good condition, in the towns where you operate and have your plants. Long-distance business will come. It is of slow growth. It can not be built up in six months or in six years—real long-distance business. So, do not be frightened.

"I have an example right here before me to-day, that happened a year ago in New York state. We had a very important connection between one of our plants and a large city. They went over to the Bell Telephone Company. They sold it to break our connection. Now, what was the result? We never lost a telephone. It never influenced our business in the slightest. We increased that month; we increased the next month, and we have been increasing each month since.

"Now, the thing that I wanted to bring to your mind is this: Keep your local service up and you will not lose a telephone. The long-distance requirements for the local place do not amount to two per cent of the gross business of your plant—two per cent of the messages that go over your plant. And the people that need long-distance will have the Bell telephone anyhow. They have got to have your telephone on account of the local connection which you hold, and which you are keeping in good condition.

The next speaker, Mr. C. E. Wilson, of Philadelphia, said:

MR. WILSON'S ADDRESS.

I approve entirely of Mr. Davis' remarks as regards the effect of long distance on your local business. While we all realize that long distance is a necessity, and that it is going to take several years to get as perfect a system as the Bell companies, we must also remember that they have been twenty-five years building up their system, and the first years they were in business they had no long distance service. We find that in our local service, if we give good service, we carry the volume of traffic—if we give good local service.

For a new company, there are a great many advantages to be urged in favor of the flat rate locally. If you give a flat rate, you get the most of the calls, and the other fellow being on the measured rate, you are taking the sustenance right out of him every time you get a call, because you are hurting him, you are doing him all the damage possible.

The argument is often advanced that the proper way is to get all the residences, and the business places will have to follow. If you did that, I think you would be several years, as a rule, putting your plant on a paying basis. Get the business places, the places that pay you the most; give them a flat rat on direct lines, and the residence business will come to you. And that being the business, as I said before, that pays you the least revenue, you do not want to take it on until you are strong enough to afford to carry it at a low rate.

I do not agree with Prof. Kelsey, that we will come entirely to the measured service. The telephone business is different from the gas and water and electric light business in that we are selling service. We are not selling any tangible thing that it costs more to produce, whether you produce considerable or whether you produce little. In the electric lighting business, the coal bill enters into it. If you are selling a great deal of current, your coal bills are, of course, high. In this business, the maintenance is the biggest item, and that item goes on whether the telephone is in use or not. The street car companies find it profitable to carry a man a block or ten miles or fifteen miles for a nickel. There are some lines of business where you have to do business on averages, the same as the street car business. They take their chances. They will give the long haul or the short haul for the same price. The United States government, and I believe all other governments, find it impracticable to carry mail matter except on one basis of charge, regardless of whether it is to be carried two miles or two thousand miles.

I think there is one thing we overlook. In selling measured service and flat rate service (I mean by flat rate service, unlimited service), so long as you have direct lines you can give flat rate service; but when you try to put two, three, four, five or six people on a line and make a contract with them to give each and every one of them unlimited service, if you just look over it a minute you will see what an unreasonable proposition it is to give any number unlimited service on the same line.

Now, we have been accused by the Bell company of withdrawing our unlimited service. We have not done that. What we have done is to quit making those foolish contracts, undertaking to give unlimited service to several parties on the same wire. The man now that wants unlimited service, if he is willing to pay us eighty dollars for a direct line, can have all the service he wants. And I am always anxious to change from the measured service to the direct line. As soon as I introduced the plan of putting the party lines on a measured service, the direct lines still on a flat rate service, I found a great many of those contracts coming in every day to have the service changed from measured to a direct line. If they formerly had a flat rate and found that they would be obliged now to take the measured service, they immediately paid the eighty dollars; and they had probably been using eighty dollars' worth. As long as they could use that line at the expense of the other fellow, they would take it at fifty-two. Then they would insist on the telephone company settling every difficulty, and the result was that we had half a dozen adjustment agencies and 99 per cent of their business was settling disputes between party line subscribers. And this measured business is apparently eliminating that trouble.

I think a point worth considering is, that you cannot give unlimited service to a number of people on one wire. But if you can get them to take direct wires, certainly give it to them. If you put your plant entirely on a measured service basis, you have no arguments. It is then just a question between you and the Bell as to which can furnish the cheapest service. In most cases the Bell plant is already installed and covers more territory than our plants; and when you have nothing different to offer, you have no good argument. It is always a good thing in selling to have something a little different from what the other fellow has to offer.

In Philadelphia the Bell company has more than twice as many telephones as we have; it has 13,000 pay stations there, and those pay stations are not earning their maintenance. Some of them are not earning their royalty, which is something like $3.00 a year per telephone. The Bell has only two arguments, and one is that it has more telephones. We reach anybody who has any considerable amount of telephone business to do and we reach the people who use telephones. We do not pay for pay stations. We won't leave them in any place one minute after we find that they do not earn us forty-eight dollars a year. We don't want them on any less basis than that. Take them out and use that pair of wires and that telephone for somewhere else. Recently we were short of cable, and we went out at that time and cut off all the pay stations that were not paying and put direct line telephones on. During that time we did not increase the number so much, it was during the time that we were endeavoring to finance our property, we did not increase much in price, and yet we increased our earnings 20 per cent by raising our rates, taking out unprofitable service and putting in the more profitable. We had to do something of that kind, because we did not have the money to spend the way the Bell was spending it at that time.

We have about twenty-three hundred pay stations and every one of them is earning money. The bell has more residence telephones, but we will get around to it now. If we had put all our money in residence telephones at $24 or $26 a year, we could not have earned anything and we would be "busted" at this time. But we went right into the heart of the city and took the best business and we are carrying on the traffic there. We are getting the best business and every call we get away from them is costing the Bell three, four or five cents.

There is one thing the Bell has been doing considerably throughout the country. About the time the Independent people would get connected up with the whole community, it would drop down and pick out one exchange; or the local people would get hot and go to fighting with their neighbors, and that would give them an excuse for selling out, and the Bell people would work in. It must be very unprofitable to them and it is very annoying to the Independent people where that is going on. We have just had a case where they bought everything in the whole county. They buy a competing line, but they always buy it through a third party and they bid around so that it is hard to fix it on them, where the ownership lies; so we don't bother our heads about that.

I see that the Bell company has bought a section out in Indiana, and it has bought some down in West Virginia, claiming that the long distance business was a necessity. Bell emissaries will go to an old farmer out in the country who never used a long distance telephone in his life, and they will convince him that his telephone service is not good unless he can talk to Boston, New York and Chicago. They used to talk this against us in Philadelphia. Now we can give them long distance connection around there in some directions two hundred miles—give very good service. We can give

them all the suburban service they want. We reach Chester, Wilmington, West Chester, Trenton, and so on. We are giving them all of that service. And now their argument is, "They can't reach New York and Boston." That is about the only argument they have left.

It is just as Mr. Davis says. I investigated, about two years ago, the question of the relation of the toll business in Philadelphia. I found the toll business about 7 per cent of the total gross, 7 per cent of eight thousand messages, seven thousand originated and terminated in Philadelphia.

As Mr. Davis says, if you just keep hammering away and watch the local service, and give as good service as you can on the long distance, you will win out. But I don't think I would abandon the flat rate service. A measured service on the party lines, and then it gives you greater flexibility. It gives you an opportunity to make several different rates with some justification.

I guess that is about all I have to say about the telephone situation in our part of the country. And I will say this, that the outlook financially is getting better all the time. Bankers are beginning to investigate the telephone securities now. Two years ago, eastern bankers, in Philadelphia and New York especially, would not touch telephone securities of any kind. They are beginning to sit up and take notice now and investigate, and the foreign bankers are, too. And I think if we can eliminate the promoter that gets in occasionally and sells a bunch of securities and acquires the whole business for a few years, we will be able to get all the money necessary.

Mr. Wilson was followed by Mr. Malin, of Clearfield, Pa., who said:

"I am not a public speaker, but I have a little information that will show you what can be done by hard work and perseverance. We started about two years ago last spring, with a Bell subscription list against us of about 800 or 1,000. To-day they have in that same territory about 400 telephones, and we have 2,000. That has been brought about, I consider, by first-class construction, first-class pole lines, standard copper wire, in fact everything first-class. If you can make the service tell, you can get results."

In his address Mr. Wm. H. Wilson, of Erie, spoke of the situation in his territory. He said in part:

The question we have under discussion is the further development of the Independent field; and, I think, it is the duty of every telephone operator that operates a plant in Pennsylvania to state before this body just what his plant has done, what he is doing and what he is going to do.

Now, the Union Telephone Company, which I am operating, takes in the northwestern counties of the state of Pennsylvania, taking the counties of Lawrence, Mercer, Crawford, Erie, McKean and Warren. The statistics of to-day show that the Bell company is operating 9,000 telephones in that district. The Union Telephone Company is operating over 15,000, and we intend to get at least 25,000 in the next few years.

There is no question in my mind but what, as Mr. Davis says, we must give good local service. That is the first particular. After that comes the development of the local service to the surrounding country. There is just about 20 per cent, may be less, of the subscribers of the Indepenedent telephone companies, who desire what is known as long distance service. What they mostly desire is short distance service, that is, in the county in which the exchange is located; they want to reach all points in that county. Now, we must develop that field, if we do that, we will get the subscribers. There is no question about it. And we will get the toll business.

Our company does not reach beyond our own district Of course, we have developed into Ohio and New York, and we reach Pittsburgh here. Our toll business over our lines amounts to $60,000 a year. What has done it? Keeping up good toll service. Keep your maintenance up to a standard and keep your local service up too, and you will get your proportion every time by doing that. But you must develop the surrounding country.

I will cite you an instance to show to what extremes the Bell company is put. We have, in the face of the fiercest opposition, developed the counties. We have gotten the farmers together. We have organized them. We have shown them how to build their lines. We have let them build their lines. We have given them connections. We do not say, "We can give you Chicago, St. Louis, and New York;" but we ask them, "How many times do you want to talk to those places?"

The point I wanted to make was that the Bell company is driven to extremes. We had organized and signed up about fifty farmers' lines near the small town of Greenville, where we have just 230 subscribers, operating locally. We signed a contract with them at a good rate for flat service for that town only, all other points we charged toll. We started this work about two months ago. You all know as telephone operators that it is very hard to get material on the ground as you order it. The wire was a little slow in coming, and I shifted the gang to another part of the district where I had everything arranged. The Bell solicitors went all over that field and told the farmers that we had given it up, that we would not do anything more with it. They came to me in a bunch and wanted to know. I said, "We are going to put your telephones in this winter. We will have them working."

There is no use being scared at this bugaboo of the Bell—no use at all. We have to work together and we have to give good service; and when you do that, you don't need to be afraid of the Bell. The long distance will come. We will get there finally. The Independents, so far as our lines are concerned, are giving good service. The bell is getting more and more apprehensive. We can reach now in our district as far east in New York as Syracuse and Elmira, and as far west as Toledo and Detroit. We can get all over from any main point. Through the Pittsburgh and Allegheny Telephone Company we can reach any point its system covers; and there is just a small piece of line to be built between Dubois and Clearfield before we can get into the United lines, at least the central part of them, and get good and efficient service.

Now, I think myself that it is the duty of every operator here to tell the convention, the members assembled, what their plants are doing, what their prospects are. We would like to know.

Mr. Wilson was followed by Mr. Theodore White, of Baltimore, who, in speaking of Independent conditions in Maryland, said:

The Independent telephone situation in Maryland, I think, is not altogether different from what it is in other parts of the country. In Baltimore the Bell company is giving people anything they want; free service, slot machine in their places of business, in their residences, or anything of the kind, without any guarantee whatever. The subscriber is not obligated to keep that telephone a year after the free service term has expired. We feel, therefore, that we have made some strides. We have between ten and twelve thousand telephones operating, against eighteen thousand Bell instruments. In that eighteen thousand I say safely that there are eight to ten thousand telephones that are not paying their maintenance and royalty on the instruments.

The Bell company is doing this for the purpose of creating a wave of public sentiment. Probably all of you do not know it, but just at this time we are in litigation over our rates, which the city failed to give us in the beginning, as to what we should get for telephone services. We have, however, raised the rate, and we have the public with us and they are supporting us from every standpoint.

We have gotten into the country—cover the state very well. We have also managed to make a long distance connection with many places.

The long distance situation seems to me to be very much to-day where the Independent local situation was five years ago. The public in Baltimore five years ago were able to communicate with 2,300 telephones; to-day they are able to communicate with between 28,000 and 30,000. We find among our patrons there that those who never thought of using long distance insisted on it, when we went to them, that they ought to have long distance connection, as has been stated by some of the other gentlemen. But we find that it is possible to develop and to create the long distance business, the same as it was the local situation. We keep a man out all the time explaining to the people the advantage of using the telephone instead of using the mail and the telegraph. One thing that has kept that down for the past twenty-five years is the charges of the Bell company. Now, with our reduced rates and good service that we have been giving in some places and are trying to give in the balance, there is not a week that our long distance solicitor does not report a coupon book sold to people that had never been using long distance before. We are in this position, however, that as to a good many of our connections through the west here, our service is not really commercial. Some of that is due to poor construction; some of it is due to somebody's putting in a few miles of old copper circuit or iron wire between good circuit, which would naturally increase the current resistance. I feel very much interested along this line.

Mr. Wilson has just said the principal thing to do with a company in the beginning is to make the local telephone pay. We have western connections here for which we are to-day paying interest on the cost of construction, where, if our service was good, we could double the business two or three times. I feel that the long distance business is not absolutely necessary to local service, but it is the most important and most substantial part, not only from the profitable standpoint, but from the standpoint of developing the local field.

The question of measured service came up. In the east, the tendency of the Bell company is to put everything on the measured service basis. It is not the tendency or inclination of our company to do anything of the kind. We also find that the fact that the Bell people do not give local subscribers unlimited single line service plays very nicely into our hands.

As Mr. Wilson, of Philadelphia, stated, it is largely a matter of maintenance and revenue, and we are working to that end. I might further state that the past year we have handled more busi-

ness with our ten thousand telephones than the Bell people have, in the city of Baltimore. We have also made it possible there for about five thousand telephone users to use ours exclusively, and we are pushing that every day.

Mr. Fair of Beaver followed Mr. White and said in part:

I want to say in the beginning that I am exceedingly glad to see this organization. While I started out as an Ohio telephone man, I have sort of wound up—not exactly done yet, but I am in Pennsylvania and have been for several years. However, this organization is entirely strange to me, and there are only two or three familiar faces. I want to see, and I believe that we shall have, an organization equal to the Ohio organization, which you all know is almost perfect under the leadership of James B. Hoge. That organization is about as perfect as you can get it. There is no reason why you should not have the same; and I assure you that the company which I represent will do its full share when we get in motion.

I do not know that it would be amiss, inasmuch as the Beaver valley is very important center, and you all feel a great interest in it, and all wish it was connected—I do not know that it would be amiss to say what I am doing there, or what we are doing, what our company has attempted—and, by the way, what we are going to do; now don't forget it, we are going to do it.

Some year and a half or two years ago, there was an organization formed known as the Beaver County Telephone Company. It was an organization composed of probably as good men as lived in the valley, very wealthy men, very good men, very honest men. I am glad to tell you that. They attempted to get franchises in the various cities and towns of that valley. They procured one or two. They were patched, and they were promptly vetoed. Not having a telephone man with them, nobody seemed to take the lead; they being business men, they just quietly subsided, lay down and waited for developments.

My work over in Bradford county completed, I came back to Ohio to take a little hand with my people again, and I was sent for. Glad of it. I was idle and I wanted to get to work.

I went down there and commenced business. I was very doubtful whether the Beaver valley was very enthusiastic in the way of telephones; I knew that the Bell company had been educating the people there for a great many years to believe that they needed but one system. And, by the way, you would be surprised at the amount of education that they have had. They are pretty well educated. But I only sent my agents around about two or three weeks till I had twelve hundred subscribers. That twelve hundred subscribers constituted the best people of the valley.

Now, the Bell telephone company has been in existence in that valley for at least twenty-five years. It boasts of seventeen hundred subscribers but has about fifteen hundred. In three weeks I had twelve hundred, and went to work to get franchises. I secured a franchise for Beaver, which was a very reasonable one. Next I secured the New Brighton franchise. We secured the Freedom franchise and many others.

And now for Beaver Falls. That is the principal city in the valley, the largest and best. I secured the Beaver franchise eleven to one. That was a good vote. But the mayor vetoed it, although it read exactly like, and was a carbon copy of the franchise which the Bell people had secured the same evening. The two franchises were made exactly alike, and the mayor's excuse for vetoing it was that the Independent franchise was not liberal enough to the city, it did not grant the city sufficient remuneration.

Well, we are going to have those franchises. We have the people with us; and you of this city who desire to talk to Beaver Falls and Beaver Valley are going to be permitted to do so. I worked hard, I worked incessantly, as I never worked before; I never quit. I have a class of people there who are wealthy, and they are for the Independent telephone, and they will stay there and I will stay there with them. And I will be a member of your association as soon as I am anything. I am not anything now, but as soon as we are anything, we will be with you. And we will fight for you, and we will fight with you. I have the honor of being one of the first Independent men in the country, and I am going to be with you to the end.

Mr. William S. Paca of Oil City, Pa., was the next speaker, he said:

I have been interested here in the discussion by the several gentlemen from the large cities and from the small towns. The way I view the situation is that there is quite a difference in the tactics and methods to be adopted in the smaller town and those that will go in the large cities.

Speaking of the measured service, I believe it would be very hard to adopt the measured service in the smaller or medium size towns, that is, towns up to twenty-five or thirty thousand. The requirements are different, and I think you have to handle them differently. That has been my experience. I think Mr. Wilson suggested that there is some business that you have to handle on an average, and I think at the present time that is the way the smaller towns have to be handled, and could not be handled any other way.

I am operating a plant in Oil City, Franklin, Titusville, and Pleasantville. When we started there, the Bell company was giving free service between those towns, and of course we thought we would have to do it, too, or we would not get any business. We started in and offered it and gradually got subscribers. Finally, we got pretty nearly even with the Bell, and we ran short of money, and the Bell seemed to find that out. So it thought it would be a good time to take its free service off, with the idea that we would not undertake to take the business, or, if we did, would be put out of business. A large number of its contracts were rewritten at some loss. Well, we continued the free service, with the result that we have about twenty-six hundred telephones in the same territory where the Bell company has less than fourteen hundred; and we have considered a number of times the advisability of attempting to take off the free service. But I have been so far of the opinion that while to take off the free service might increase our toll business a little, yet it might incline a number of them to discontinue the service, and that, therefore, it would cost us considerably more to fight and try to hold on to our business. So that I think it is a matter to be governed by local conditions, as to whether it is wiser to give free service between towns or to confine it strictly to local service.

And another matter. My experience has led me to believe that we want the residence business first, though I believe it has been said here to-day that you want the business places first. But my experience has taught me that if we get the residences, we can get the business. We have had examples of it in Franklin and Oil City. We went into the residences among the medium class of people and secured those residences. The consequence is, we have every business place; until the only place of any importance that we do not have in the three towns, or in Oil City, the largest town, is the Oil City Derrick. And I was going to suggest that I would like the paper that publishes the photograph of this association to forward a copy of it to the Oil City Derrick, to Mr. Boyle, so that it will make him recognize that the Independent telephone interests amount to something and that the Oil City Derrick should have that kind of a telephone. And I would like to see that done.

Our company has had great growth. Now we were, in one town especially, Franklin, kind of shaky, the Bell had a little the best of it. And I built three or four lines out in the country, running five to seven miles, and brought in about fifty farmers and oil producers along those lines, with the result that now we have three hundred more telephones in Franklin than the Bell people; and, I think, all brought about by running those farmers' lines. A farmer will not have two telephones. It is not going to pay to run duplicate lines.

Following Mr. Paca's remarks Mr. McCarty of Pittsburg said:

"I want to say a little something on the construction work. Mr. Schade says he has a standard plant. Now, we all claim we have standard plants. What I would suggest is that we get together and standardize the construction. You go to any one place, and you will find poles not set right, according to different construction men; and they will put them up regardless of what the maintenance is going to cost. Now, I do not believe in that kind of construction work. I believe in putting them up to stay. If it is worth doing at all, it is worth doing well.

"I might say that at Harrisburg I believe there was a standard adopted. What I believe we attempted there was to agree not to connect with any companies that did not have standard construction; if they did not have standard construction, not to connect up until they did. Whether this carried or not I am not in a position to say."

Mr. T. B. Lee of Washington followed Mr. McCarty. He said:

"The matter that I am about to bring up now relates to the methods that the Federal company has used in this district to keep out the Independent telephone. The Federal Telephone Company has gone into boroughs surrounding Pittsburgh and Allegheny and used such methods that it was almost impossible for Independent telephone companies to get franchises or to get in there. Their tactics during the past year have been something that only those among us that have worked against them know just what they are.

"As an illustration: An Independent company entered the Borough of Wilkinsburg and put in their telephones, secured their subscribers, and so on. The Federal Telephone Company followed in there, and they gave a telephone absolutely free to every subscriber that the home telephone company had obtained.

"And the Federal Telephone Company now is embarrassing the Independents in Washington county in particular, and in some other points around here, and we know who the Federal Telephone Company are.

"I want to ask that this convention take action here to-day, declaring that the Federal Telephone Company is not an Independent telephone company, so that their injury to the Independents can be recognized.

"Now, I am going to ask Mr. Hamlin of Wheeling, who knows something of the Federal and their actions, to make a statement also to this effect."

Mr. Hamlin of Wheeling was introduced and spoke as follows:

"I am very glad indeed to be able to say anything in explanation and concerning the tactics of the Federal Telephone Company.

"Our company has come in contact with the Federal in a number of places. The first instance was in the town of Moundsville, which is properly a part of the Wheeling district, being located directly south of Wheeling.

"The Federal Telephone Company put a plant in there while our company was building in Wheeling. We tried directly to secure possession of that plant at that time, recognizing the Federal as Independent. We then opened negotiations through another company. We were unable to do anything then. We offered to buy it, and as a method of getting at the right price, the suggestion was offered that three appraisers be appointed to set a value on the plant, and we would give one thousand dollars more than they decided it was worth. The plant was a small one, and the appraisement, added to that thousand dollars, would probably run $4,500.

"We met Mr. DeLand in our office and offered him $5,000 for the plant. Mr. DeLand's price was $10,000. We even started to intimate to Mr. DeLand that we would give him $10,000 for his plant, and he withdrew his proposition altogether.

"We then built in the town of Moundsville, and in one year after we were in operation, the Federal Telephone Company operated seven telephones in the town. Two of them were free telephones, by reason of their franchise, one was an operator's telephone, and the others I do not think were paid for. They even tried to embarrass us by offering free service in the town. Their service was of no value, for the reason that Moundsville is really part of Wheeling, and the people needed Wheeling service. The Federal Telephone Company was, at length, closed down.

"The next time that our company came in contact with the Federal company, we were asked for connection between Wheeling and the Washington plant, of which they agreed to build sixteen miles. The overtures were from Mr. Throgmorton of the Allegheny Telephone Company.

"I called on Mr. DeLand in his office in Pittsburgh, agreeing to make the contract with them on an interchange of business and mileage basis, they to build half the line and we to build half the line. Mr. DeLand informed our company that when we paid him for Moundsville, he would connect with us. As we were not ready to pay him for Moundsville, we did not make connections with the Federal.

"Mr. DeLand then commenced to make a campaign against the little companies in Washington county. He sold then to the Claysville Telephone Company some small properties. He entered into a contract, which was a perfectly fair contract. He broke that contract without right or reason. The man operating Claysville was afraid of DeLand, and he entered into another contract with DeLand, which increased the toll. The first contract was for ten years; the second contract was for five years. They entered into that contract. He broke that contract without right or reason. He then entered into a third contract, in which he stipulated and incorporated in the contract that the Claysville Telephone Company was not to do any business with any company that was not in harmony with the Federal Telephone Company. It meant that the Claysville Telephone Company could not do business with the Pittsburg and Allegheny Telephone Company and others. And if that contract was not signed, Mr. DeLand declared he would build Claysville. And he went so far as to build a station, which is still in operation, in competition with a plant with which he had a contract.

"He went even further than that. A little plant in the center of Washington county was developing the farming community. They were ready to close a contract which would enable them to extend their service considerably. And Mr. DeLand's representatives went to the Buffalo company and told them that if they contracted with the State Mutual Company or did business with them, if they made a contract with the Claysville Telephone Company or, in fact, any company that was not in harmony with them, that they would be cut off from their present service. And as their present service included Washington, it was very important to them.

"Every act that the Federal Telephone Company has done in Washington, or any place else that our company has come in contact with them, has been directly against the interests of the Independent telephone company. And while I am not a member of your association and our company operates almost entirely in West Virginia—although we have some Pennsylvania lines—I really believe that it would be a big help to the company that is now endeavoring to get a franchise in Washington. And as sure as that company gets a franchise in Washington and a plant is built there, the Federal telephone exchange will be closed; just as they have been closed in others, as the Pittsburg and Allegheny Telephone Company has closed them in all the towns about Pittsburg and as we have closed the one in Moundsville, every one of those plants can be closed up. And if this convention, by resolution, will declare—as you certainly all know, that the Federal Telephone Company is not an Independent telephone company, you will aid very materially the fight that is now going on in Washington county.

"The Bell is very much alive to the situation there. You know what they did in Green county, which is directly to the south,—that they took away from us 1,300 telephones in the way of a sub-license contract. They have not stopped there.

"All around the borders of Green county little telephone plants exist that are entirely local and that take in practically all of Green county. The Bell representatives even went there. It has endeavored to make sub-license contracts with those companies. And if we do not stop it, it is going to grow and grow, because one company affects another.

"So, there is one good way to stop it and one step that will help a whole lot. The State Mutual Company has now pending in Washington a franchise that is generally looked on with favor by the people of Washington and by the council. The Federal Telephone Company are endeavoring to claim or to show that they are Independent and that there is no necessity for another company. We all know that there is necessity. And I believe that the convention can help us very much. While our company is not interested in the State Mutual Company, we are interested, because Washington is very near to us. And I believe if you will act on it by resolution, I believe it will help the State Mutual Company very much.

"That ordinance will come up on the twentieth of this month. I voice the sentiments of Mr. Lee, who is a representative of the State Mutual Company and a member of your Association, and my talk has been altogether on the line that I knew something of the methods of the Federal Telephone Company, because we had met them, we had fought them."

Mr. Wilson of Philadelphia was recognized by the chair, he said:

"I have listened to the remarks regarding the Federal Telephone Company and their tactics. And I think I mentioned to some of the members of the Executive Committee of this Association, that in cases where Bell interests were masquerading under the guise of Independent people; or, not only that, but promoters who were going in for the express purpose of holding some of us up; that the State Association and the National Association could settle that matter by having a committee who would look over the credentials and declare who are and who are not Independent.

"Occasionally there will some one bob up, and it occurs to him that he can hold us up and get something for getting out of town, $500 to $1,000, for his nuisance capacity, you might say. And if you don't give it to him, he will offer a franchise with limitations and conditions, and council will say, 'Now if this man is willing to take a franchse of this kind, you ought to do it.' And a good many of our companies have taken franchises that they would better not have taken.

"I do not know whether it can be formulated in any way, but if we had a committee on credentials in both State and National Association, to take up just such cases as this one in point, when they passed on that and said, 'These people represent Independent interests; these other people do not,' I think that would settle it in the minds of a community, as a rule, when we could bring that proof; especially if it had back of it the scope of the Association.

"But I do think if the Association would use its power rightly directed, it could assist the members who are rightly entitled to franchises or legislation."

Mr. Lee recognized:

"The condition is this in Washington: The Federal Telephone Company is operating there at the present time, and say to the people, 'Look how mean the Independent treat us. We will give you service to-morrow, if the Pittsburgh and Allegheny Telephone Company will let us in.' Now the people of Washington say to me, 'Lee, you fellows are to blame.' The Federal Telephone Company uses those tactics to keep us from getting a franchise in the borough of Washington.

"We want the people to know that the Federal Telephone Company is and always has been the property of the Bell Telephone Company. The buying of these small plants and running them down is evidence of that. Forty per cent in Allegheny county have shut down because of the Pittsburgh & Allegheny Telephone Company entering those boroughs.

"If this Convention will state to the people that we know that the Federal Telephone Company is sailing under false colors, it will aid us in getting connection in Washington, which is a town of thirty thousand people. And we need them. And that is where we can aid the Independents right now, so let us do it."

Mr. Splane recognized:

"On behalf of the Pittsburgh and Allegheny Telephone Company, I wish to state that the Federal Telephone Company could have had connection with Pittsburgh at any period during the last four years, but no inducements could be offered to the Federal Telephone Company to get into Pittsburgh. They did not want it."

Mr. Wilson of Philadelphia recognized:

"I would offer a resolution which may be of some assistance to these gentlemen just now having their fight in Washington county, and which, by the way, should be followed up by the different associations; I would suggest something like this:

It is resolved by the members of the Pennsylvania State Independent Telephone Association, assembled in convention at Pittsburgh, that the Federal Telephone Company, of Pennsylvania, by their acts and deeds, in every respect, relating to Independent telephone companies, have proved to our entire satisfaction, beyond the possibility of doubt in our minds, that they are not an Independent company in the true sense of the word, and that they are allied, directly or indirectly, with the Bell company; and that their operations have tended to impede, rather than to assist, in the development of the Independent interests. This resolution refers to the company which is controlled by Mr. Fred DeLand and associates.

On motion duly made and seconded, this resolution was unanimously passed.

Mr. Bradley of Philadelphia recognized:

"I just want to speak about the Association bringing up the Federal matter here. I want to say that the Federal has made an application for membership in this Association, but, of course, it is needless to say that they were very quickly turned down, as soon as the name signed at the bottom of the petition, 'DeLand,' was seen.

"Now, at the present time, we have in the Association all the larger companies in the state. Of course, we want the larger companies, as well as the smaller ones. They need the association more than the big ones, and the big ones are ready to help them. That is the only way. We want all the little companies in the state. We want them to come in now. Anyone who is here can get an application. We want every company in the state to become active members. And not only that, but we want every man in the state who is interested in any way to become an associate member. It will only cost you a dollar. If we have every one as a member, it will keep up the interest. But we not only want these big companies, who don't need a great deal of advice and assistance, but we want the little companies, who do need advice and assistance, and who will come to the Executive Committee when they do need assistance. When you have trouble, why bring that to us and we will do all we can to help you out. We have a way of writing down there, and if anybody around the state has any trouble that he can't just get his finger on at once, if he will write us a letter and send it to the secretary, he will send it to someone who will help him out.

"The membership now represents fifty-nine thousand seven hundred and fifty telephones, and about thirty-two thousand miles of circuit. But there are 83 Independent companies and they represent about ninety-five thousand telephones, and the rest of that number is made up by smaller companies, we have not been able to reach. We have a list from the Secretary of Internal Affairs and we have tried to reach every one. If we have not reached every one, it is not because we have not wanted to reach them and have not tried."

Mr. Wilson recognized:

"I move that a copy of the resolution just passed be drawn and executed by the proper officers of this Convention and given to Mr. Lee to assist him in his good work in Washington county."

Motion duly seconded and carried unanimously.

Mr. Theyer recognized:

"Just a word in regard to that resolution. I am up against the same thing as the other people. I trust this resolution is for publication and our city papers will take that up. And if they would, it would do me a wonderful sight of good, and I presume it would my friends. The same proposition exists with me, and that was the very reason why one of my franchises was turned down, because an Independent telephone company had set up some poles. They had not done any good; they had not installed a plant; but that was one of the excuses."

Mr. Lee recognized:

"Inasmuch as the Federal telephone question has been brought up again, I want to state a little further in regard to the resolution that has been passed. This is only one of the numerous things I could tell, but this is most recent.

"Within the last four months, a gentleman came to me for employment. He said that he expected to sever his connection with the Federal Telephone Company the first of the

month; and I said to him, 'Why are you doing that?' He said, 'Mr. DeLand told me a month ago that after a certain period they would not be able to retain a number of the employes; but he stated to me that the Central District and Printing Telegraph Company would take care of all the employes; they would give us all positions. I was down there this morning to see what kind of a position they were going to give to me.' He had been drawing $100. They offered him a position in the auditor's office at $65 a month. He said several of the boys had been taken care of by the Bell. Mr. DeLand had told him that he had sold out to the Bell Telephone Company, that he simply had to, that he was not making any money out of his plants. I said, 'Will you make an affidavit of that?' He said, 'I will.'

"And one other employe of the Federal came to me a short time after this and practically told me the same thing. It is a matter of newspaper report within a period of six months—the different towns where the Federal were turning their poles over to the Bell Telephone Company. In one case, I think it was up at Millvale, a resolution had been introduced in council, giving the Federal permission to turn their poles over to the Bell Telephone Company.

"In McKeesport, the stronghold of the Federal, the time the Pittsburg and Allegheny were negotiating for the purchase of the Independent company, the Federal stepped in and bought it, paying, I understand, approximately, a hundred thousand dollars in cash. At that time they had commenced a plant and had about a thousand telephones, probably more than a thousand. They took possession. It went down to about six hundred telephones during a period of two or three years. After the Pittsburg and Allegheny had been defeated in the purchase of the Independent plant in McKeesport, it built a plant and put it in operation a little over a year ago. About five or six months ago, the Federal abandoned McKeesport entirely, turning over some of their telephones in that vicinity, and such poles as the Bell Telephone Company needed, to the Bell Telephone Company. Previous to their abandoning the field, the Bell solicitors were around among the subscribers, telling them what was going to be done and trying to get them to take Bell telephones.

"Now, that is only one or two of many instances that I can tell along the same line. Indeed, I could almost state publicly, and were I put on the witness stand under oath I could make affidavit to the fact, that the money that went into the Federal Telephone Company came from Bell sources. There was a time, before I was connected with the Independent interests in any way, that I had certain sources of information, and that is why I make that statement public."

On motion duly made and seconded, Convention adjourned sine die. In the evening of the second day a banquet was held at the Monongahela House, which was attended by about 125 delegates. Senator John S. Weller, vice-president and general counsel of the Pittsburg and Allegheny Telephone Company, was toastmaster and speeches were made by a number of the officials of the Independent telephone companies of the state.

## TELEPHONE POSSIBILITIES.

Aside from its most simple manifestations as a box on the wall through which one may converse with half a continent, the telephone itself has a remarkable number of adaptations to domestic living. There are telephones so arranged, for example, that the transmitter and receiver may be taken down at night and carried to bed with you—which is a much better protection for the family silver than to put it under the mattress. Special instruments of this kind are made for physicians and so designed that the owner may speak and listen comfortably without even taking his head off the pillow. Other instruments, in large mansions, are so arranged that the butler who answers the general call can immediately connect the caller with whatever part of the house the owner or his good wife happens to be in at the moment, and others are so arranged that the bell sounds in different places while the telephone itself occupies the most central and convenient place.

Curious, too, are the places in which some people keep their telephones. A lady, for example, went not long ago to pay a visit to an old friend, now situated in a splendid New York mansion. The room into which she was shown was a large drawing room filled with bric-a-brac, and, in one corner, a splendid old Sedan chair that the owner had "picked up" in Europe. The visitor, making a tour of inspection to while away the time till her hostess should appear to receive her, approached the old Sedan chair and was suddenly surprised by the sound of a bell ringing within it. Somewhat startled she stepped back, when a neat maid appeared mysteriously, stepped into the old chair and began a conversation over the omnipresent telephone concealed within it. As the hostess explained afterward, it made a "perfectly lovely" telephone booth, and the ghosts of its former occupants probably enjoyed the stray bits of gossip they now and then overheard between herself and a list of friends and acquaintances all over the country.

## PARTY LINE NUMBERING.

A new method of numbering telephones on a party line has been devised by L. O. Surles and is being used by the Chipley Mutual Telephone Company of Chipley, Ga.

This method is very simple and is designed to overcome the confusion and necessity of keeping at the board a list of subscribers on party lines. It is a time saver as a trial has proven. The operator knows by the number called for what signal to ring on a certain line.

The plan is as follows: Each party on a party line is given a number just as a party on a single line, only the number printed in the directory is in red or blue ink, as the case may be, or the word red or blue is placed after the number, viz., 48 red, 56 blue, etc.

The single lines in the exchange are as usual in black ink.

Two cards are provided the operator, which are placed on the front of the board where the operator can readily refer to them.

Upon these cards are arranged a code of rings, twenty in number, ten red and ten blue, numbered from 0 to 9, as shown in the accompanying diagrams:

Thus a party calling for 48 red the operator would plug in line four and ring the eighth ring on the card of red signals, which is, short, long, short.

Should 135 red be called plug in line thirteen and ring fifth ring on red code.

The red numbers are used until the number on the line exceeds ten, when the blue code is used.

These cards are all that an operator needs to direct her to parties on party lines.

It will be well to note that when a red or blue number is called that a party line is wanted and not a single line. For instance, should a party call forty-four red or forty-four blue, plug line four and not forty-four, as that may be a single line. Ring fourth ring on color called.

# First Aid in Cases of Electric Shock

**Originated by the United Gas Improvement Company of Philadelphia**

TO GIVE proper assistance to persons shocked by electricity, it is necessary to have on hand the following materials, contained in the company's emergency kit for electric shock cases, as shown in Figure 1:

(a) A bottle of aromatic spirits of ammonia.

(b) A bottle of ordinary ammonia, with sponge attachment.

FIGURE 1.

(c) A package of bicarbonate of soda (ordinary baking soda).

(d) A tin cup.

(e) A pair of tongue pliers.

(f) A towel.

(g) A package of antiseptic cotton.

(h) A roll of antiseptic bandaging.

(i) A roll of adhesive tape.

In case of electric shock, instantaneous death or only temporary unconsciousness may result. The treatment in both cases is as follows, and it should be carried out in

FIGURE 2.

every instance, even though the person is apparently dead, for he might be only temporarily unconscious.

Send for a doctor at once, in the meantime acting as follows: Carry the patient immediately into fresh air. Place him on his back on a flat surface, with a coat rolled (not folded) under the shoulders and neck, in such a way as to allow the head to fall backward enough to straighten the wind-pipe, as shown in Figure 2; at the same time open the shirt wide at neck and loosen the trousers and drawers at waist, and have an assistant rub his legs hard.

The sleeves and trouser legs should be rolled up as far as possible, so that the rubbing may be done on the bare skin, and the shirt and undershirt should be torn down the front so that they may be thrown back, leaving the chest and stomach bare, as shown in Figure 10.

Open his mouth, forcing the jaw if necessary. If the jaw is rigid it can be forced open by placing the forefinger back of the bend of the lower jawbone and the thumbs of both hands on the chin, pulling forward with fingers and pressing jaw open with thumbs, as shown in Figure 3.

Place something (piece of wood shown in Figure 3) between the teeth to keep the jaws open and to prevent the patient biting his tongue, using something large enough to prevent any danger of his swallowing it accidentally; grasp the tongue with the tongue pliers, as shown in Figure 4, having an assistant hold it out while you are helping the patient to breathe, as described below.

In the absence of tongue pliers, the tongue may be

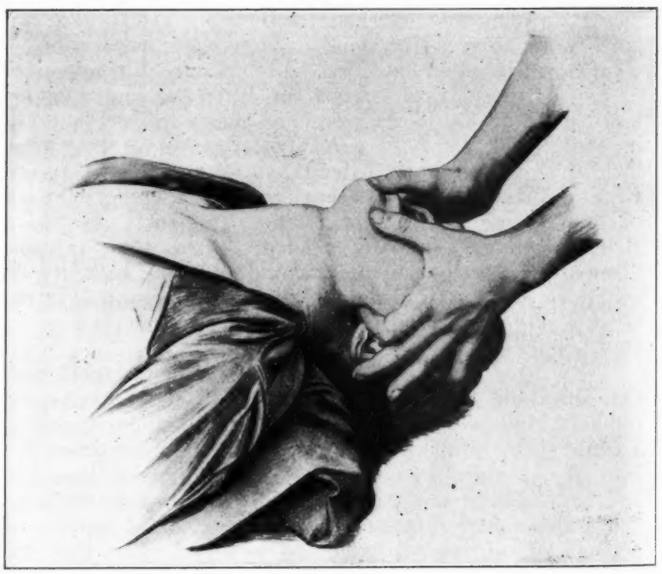


FIGURE 3.

grasped between the index and second fingers, after they have been covered with a handkerchief.

Clear froth from the mouth by putting in your forefinger as far as possible and bringing up the froth with a scooping motion. Have the assistant who is holding the tongue slowly pass the bottle of ammonia, with sponge attachment, under the patient's nose about once a minute when the patient is breathing in, and when his arms are extended above his head, as shown in Figure 10.

While you are preparing the patient as just described, an assistant should force the air out of the lungs by pressing the base of the ribs together about once every four seconds, as shown in Figure 5. Do not press vertically, but press on the patient's side (palms of hands over lower ribs) in such a manner as to force as much air out of the lungs as possible.

After the clothing has been loosened, the jaw forced open, as shown in Figure 4, the froth cleared from the mouth and the tongue grasped, begin artificial breathing at once as follows:

Kneel far enough behind the head of the patient to prevent interference with the man holding the tongue. Bend the patient's arms so that the hands meet on the chest; grasp the patient's forearms firmly, as close as possible to the bent elbows, then firmly press the patient's elbows against the sides of his body so as to drive the air out of the lungs, as shown in Figure 6, raising the arms slowly with a sweeping motion until the patient's hands meet above

FIGURE 4.

(or behind) the patient's head, as shown in Figure 7; then while you have the patient's arms stretched out in line with his body, give them a slow strong pull, until you have expanded or raised his chest as high as it will go, as shown in Figure 8; then bring the arms, with bent elbows, down against the sides, and press them firmly as before, as shown in Figure 6.

This action should be continued about fifteen times a minute until the patient begins to breathe. You must guard against a tendency to make these motions too fast; they must be done slowly. A good plan is to count four slowly—"one," as the pressure is given on the sides, as shown in Figure 6; "two," as the arms are being extended above the

FIGURE 5.

head, as shown in Figure 7; "three," as the strong pull is given, as shown in Figure 8, and "four," when the arms are again being bent and returned to the sides, as shown in Figure 9.

Do not let your hands on the forearms slip away from the elbows; the best result comes from grasping close to the elbows, as shown in Figure 9.

The operator must appreciate the fact that this manipulation must be executed with methodical deliberation, just as described, and never hurriedly or half-heartedly. To grasp the arms and move them rapidly up and down like a pump handle is both absurd and absolutely useless.

Each time the arms are pulled above the head and the chest expanded, the assistant who is holding the tongue should pull the tongue out and downward, and another assistant should, from time to time, slap the chest with a towel or cloth wet with cold water, as shown in Figure 10.

When the patient is breathing by himsef, the process of artificial breathing can be stopped, but the process of pressing the sides every other time he breathes out, should be started as follows:

Do not press vertically, but press on the patient's side

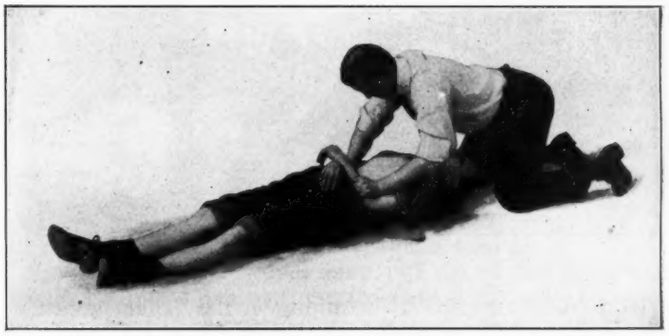


FIGURE 6.

(palms of hands over lower ribs) in such a manner as to force as much air out of the lungs as possible, Figure 5. You can carry out this pressing action most successfully, if, on beginning, you move your hands in and out with every breath, pressing very lightly, until you have established a rhythmical motion of your hands in unison with the patient's breathing; then you can begin to press hard at every other outgoing breath.

The object of doing this is to strengthen his breathing. By making the pressure every other time he breathes out, you give him an opportunity to take a breath himself, and this natural effort to breathe is in itself strengthening to the action of the lungs.

Continue this pressing action until the man is conscious and breathing well by himself.

FIGURE 7.

The rubbing of the legs and arms should continue as long as the artificial breathing, or pressing action, is necessary, and the holding of the tongue, and the passing of the bottle of ammonia with sponge attachment under the nose, as long as he is unconscious, as shown in Figure 5.

After he becomes conscious, give him a half teaspoonful of aromatic spirits of ammonia in a third of a glass of water. After you have brought him around, surround him with bottles of hot water.

Beer bottles are easily obtained, and should be filled with hot water and covered with a paper or cloth to prevent burning the flesh. Hot bricks, also covered, or gas bags filled with hot water will answer as well. Then cover him with a coat and watch him, as shown in Figure 11.

FIGURE 8.

In performing artificial breathing, if the patient does not show any signs of coming to life promptly, you should not be discouraged, but should continue the motions regularly for at least one hour, summoning such assistance as you may need. Cases are known where patients showing no

FIGURE 9.

signs of life after an hour's work have still recovered, and their recovery was due entirely to the faithful persistence of the person in charge.

Persons shocked by electricity need fresh air; therefore,

FIGURE 10.

bystanders should not be permitted to crowd around a patient, and no one should be allowed to approach him except those carrying out these instructions.

The recovery of a person unconscious from electric shock may be hastened by the use of oxygen, which should be administered at the discretion of the doctor.

Electric shocks are often accompanied by various types of burns, which should be treated as follows:

Have the injured attended by a doctor as soon as possible. In the meantime cover the burned surface with cotton, saturated in a strong solution of bicarbonate of soda and water, as much soda as the water will absorb, and then wrap with light bandaging. In the absence of soda, carron oil may be used in the same manner.

Even apparently slight burns should be treated by a doctor, as the injuries are likely to prove more serious than those resulting from ordinary burns.

Should the articles contained in the company's emergency kit for electric shock cases not be on hand when need, after sending for a doctor, every effort should be made to revive

FIGURE 11.

the patient, by following the course of movements described until the doctor arrives and the necessary articles are secured.

## VERMONT AND NEW HAMPSHIRE CONVENTION.

A convention of the Independent telephone companies of Vermont and New Hampshire was held at Hotel Wentworth, Woodsville, N. H. There was a large attendance present from both states.

The object of this convention was to form an Independent telephone association of all companies in Vermont and New Hampshire, the aim and purpose of the association being to cement together in a firmer union all Independent telephone interests in that section for the purpose of promoting uniformity of operation, maintenance and construction; to protect and defend all Independent telephone interests by moral efforts, co-operation and such other available means as deemed advisable; to prevent the enactment of hostile legislation and any and all other purposes to the best interests of the Independent telephone movement.

An organization was formed and the following officers elected: H. W. Buchanan, Barton Landing, president; C. D. Eastman, Woodsville, N. H., vice-president; G. W. Buzzell, St. Johnsbury, Vt., secretary and treasurer. There were twenty vice-presidents elected to serve as committees of arrangements. The association will be called the "Vermont and New Hampshire Independent Telephone Association" and it invites every Independent telephone man and company to co-operate with it in the good work.

The organizing of the Independent telephone companies of New England is a very desirable thing, and this first meeting is a step in the right direction.

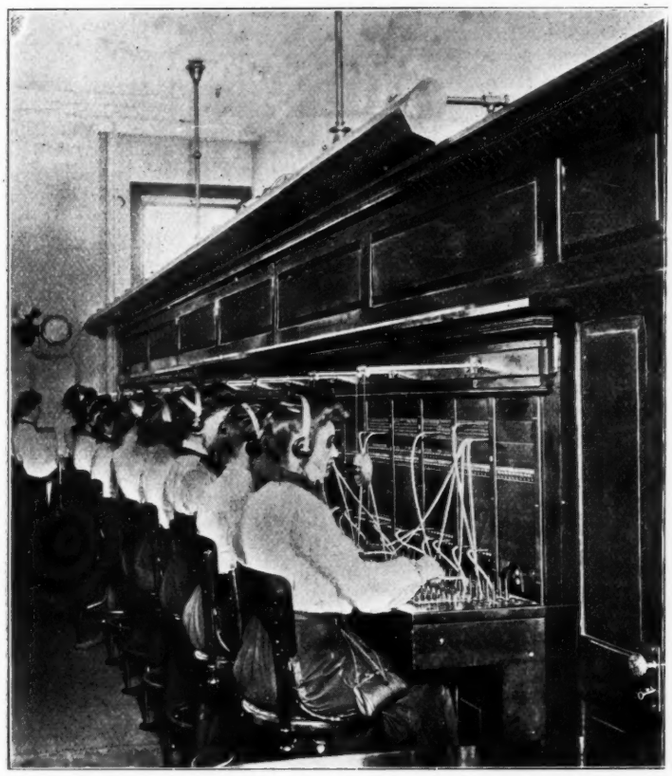
# The Private Branch Exchange

A. G. BROWN

THE private branch exchange has made its way to the front, and become an indispensable factor to the firm of large business interests, where communications between its numerous departments are required in order that its affairs be conducted with the dispatch and rapidity necessary.

Private branch exchanges that permitted of direct connection out, and employed an operator to handle all calls during business hours were almost unknown say ten years ago, and are a comparative new auxiliary in the business world.

Municipalities, in the conduct of their different departments, such as police, fire, water, etc., employed them; here and there enterprising firms, with offices separate from their factory, are a few who enjoyed their vast advantages in the years past, but up to a few years ago the private branch exchange was not considered by the average business firms or corporations as a necessary adjunct to their business; but time brings many changes, and to-day one can find them installed in every business house of any magnitude. Railroads find it facilitates their methods in handling traffic, hotels provide them for the convenience of their guests, making it possible for them to talk almost anywhere without leaving their rooms. Newspapers find them indispensable in expediting news gathering. Wherever we go we invariably find the private branch exchange a servant of ability and of inestimable value to its employer. This is a correct statement of its merit and possibilities where a competent operator is employed to give it undivided attention, or at any rate to give it precedence over any other work; for right here is where the efficiency of a private branch exchange is determined. A careless or incompetent operator has often caused the service to be complained of as faulty and unsatisfactory to the extent of discontinuance in rare cases. It is highly important that a person of ability be employed in this work; one who has some ideas of talking to the public. A new customer sometimes forms his opinions of the house and its methods by the person who talks to him over the line, and it is obvious that in all cases the standard of intelligence must be of a higher order than that possessed by the average office boy. The most convenient means of entering a man's place of business is by the telephone; and a sound business man should not obstruct this path to his own detriment. A private branch exchange is only a means to an end, and is the same as others of its kind; the same as the tools of the artisan, which, when new, are all alike, but they do not turn out the same class of work. The results depend upon the skill of the person handling the tools, and so, with our switchboard. It depends entirely on the skill of the operator. I recall a few cases where firms having a private branch exchange would complain about the service in general. "It is very unsatisfactory," they would say. "Take it out; we can't use it," and talk along such lines, and when the matter was probed it would reveal no fault of the equipment, the trunking service was fast and efficient, but the service at the private branch exchange was lamentably weak; it was found that this important task was assigned to the office boy, together with other duties which would sometimes take him away from the premises for an hour at a time, and during his absence the responsibility of operating the switchboard devolved on anybody that happened to have the leisure, which means nobody. Such conditions are inimical to good service, should be avoided by the concern, and not tolerated by the telephone company of which it is a branch.



LARGEST PRIVATE BRANCH EXCHANGE IN THE WORLD—MARSHALL FIELD & COMPANY, CHICAGO.

Another condition which frequently arises and causes provocation to the user of a private branch exchange is his inability to at all times get out on a trunk line. This is a matter of no small annoyance, but can be overcome by proper adjustment of trunk lines. A record should be kept of all incoming and outgoing calls for an extended period, observing how often these congestions occur, note origin of calls with a view to ascertaining whether a certain department or departments are abusing the telephone service in utilizing it for purposes other than affairs of the concern, and whether they dispose of the business over the line as it comes up, or whether they neglect it until the closing hour and then get busy and want to rush matters. If it is found that the incoming traffic is clogging outgoing business, a certain number of trunk lines should be assigned for incoming and a certain number for outgoing calls, thereby avoiding the collisions which are sure to occur unless arranged in this manner.

In conclusion let me say that in order to obtain the highest efficiency from your private branch exchange you must educate your forces along the lines under discussion; get a competent operator, report troubles with equipment immediately and to the proper departments, insist on prompt repairs when out of order, use reasonable care in the use of your apparatus, which necessarily consists of many delicate parts, and you will get full value in return for your investment.

# Concerning Telephone Maintenance

SAMUEL G. McMEEN

Broadly viewed, the task of maintaining telephone lines, appliances and devices is no different from the task of maintaining any other thing or group of things, which is utilized for an industrial purpose. There is no form of manufacturing or public service into which machinery or other material enters at all, in which there is not needed the expenditure of labor and of material in keeping the plant in sufficiently good operative condition.

There is in the telephone business, however, a particularly great need for care in keeping the physical property in a satisfactorily workable condition, and this lies in the fact that, like the business itself, the plant consists of a very great multitude of details. As each element of this multitude has its particular requirements as to necessary care, and as the failure of one element naturally interferes with the performance of many, the quality of the service rendered, which is the first consideration, must suffer or benefit by the quality of care. Similarly the costs of making telephone service are dependent in a large degree upon the nature, as well as the total expense, of maintenance operations. While it is not my purpose to develop this phase of maintenance consideration in this part of the study, it must be noted that whether an annual maintenance cost for a given property be high or low, maintenance is an entity wholly distinct *so far as accounting* is concerned from depreciation and charges relative to it.

Perhaps the most convenient analogy to clarify and fix in mind the matter of maintenance costs and depreciation costs, is a homely one involving something familiar to all. A suit of clothes, costing a given sum, will have a useful life depending upon the original quality of the fabric and its workmanship, and upon the degree, length and character of its use. In a longer or shorter time the suit must be discarded as no longer useful for the wearer's purposes. Whatever may have been the length of time in which it was useful, the depreciation will have been total, or 100 per cent, if the suit is a total loss at the end of the time; or if it is sold for a small sum, the depreciation will be something less than 100 per cent, as determined by the original cost and salvage price.

Noting the exactness of distinction between maintenance and its cost, and depreciation and its cost, it is well to observe that in the chosen instance of a suit of clothes, cleaning, pressing, and the care of buttons, button-holes and rents were required during the period of its useful life. These would be required in varying degrees in different circumstances, being governed by the fortunes of accident and the character of use. Whatever might be the expenditure in these minor maintenance repairs, however, a day of complete dilapidation and abandonment must come. A careful accounting, therefore, would have shown for the suit's history, not only its original cost, its final ragman's salvage value, its depreciation, both in dollars and in percentage, but in detail its maintenance expense. Both depreciation and maintenance costs might, therefore, from these records, be reduced to unit costs per annum.

Interesting and important as are these elements of accounting, they have to do quite as much with the character of labor expended in caring for the things as with original costs and rates of expenditure. It is the immediate object of this series to deal with the homely processes of maintenance, particularly with those so widely termed "trouble shooting."

Much experience has taught those who have become wise concerning maintenance, that the best results can be secured only in organizations using the services of well-informed workmen in the maintenance department. No amount of exactness in formal rules is effective as a substitute for an intimate knowledge of conditions, causes and effects, on the part of the inspectors and other troublemen.

The requirement of detail knowledge in this quarter is greater in small exchanges than in large ones, as in the latter approximate results may be obtained by the direction of partly informed men by others who are thoroughly trained. The ambitious young man beginning his telephone experience would seem to be wise, therefore, in choosing

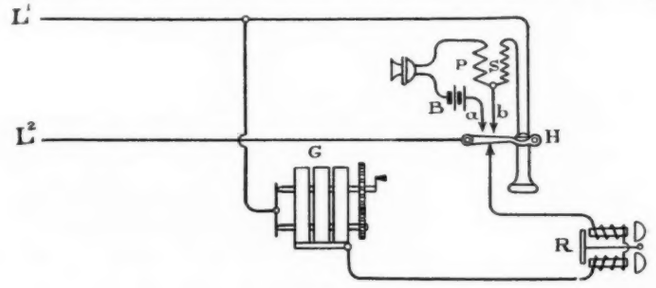



FIG. 1.

a course which seems more likely to result, when he shall have connected himself with the larger interests, in placing him in a position of direction rather than in one merely of immediate execution.

In harmony with the belief that a knowledge of principles and reasons is essential to success in an inspector's work, description accompanies specification herein. It is hoped that the rules, in most cases, will be found obvious.

### SUBSTATION EQUIPMENTS.

To the subscriber the beginning and end of the telephone business is the equipment on his premises. To the operating company the total substation equipment is but one of the four great groups involved. To the inspector, its order of importance is akin to its relation to the subscriber, as other items of equipment are largely designed with rela-

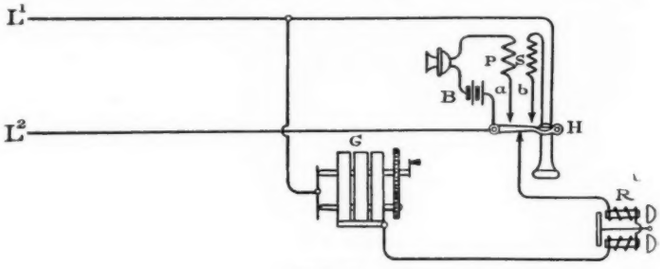



FIG. 2.

tion to it. Substation equipments are variously known, the manufacturer knowing them as subscribers' sets. There is no close distinction between the terms "substation equipment," "subscriber's set," and "subscriber's telephone." In this study no distinction will be made, unless in special cases, between a subscriber's telephone and the similar devices used in a public toll station in or out of an exchange district.

Subscribers' sets are of the local battery or common battery type. If of the former, a battery forms a part of the equipment, and in practically all installations in service today, this battery is of the primary type, producing current

by original chemical action within it, and is not a secondary or storage battery.

Common battery subscribers' sets include no battery, either of the primary or storage type. The currents required for all the operations of the substation are generated in and furnished from the central office.

As is true of any other part of the telephone equipment, the subscriber's set is most conveniently studied by considering it divided into general parts. A convenient division is as follows:

The talking circuit.

The ringing circuit.

In a local battery set, the talking circuit includes the elements of a receiver, a transmitter and a battery, together with their wiring, and a part of the elements and uses of the hookswitch.

The ringing circuit includes the ringer, the generator, the wiring belonging to them, and the remaining part of the elements and uses of the hookswitch.

Figs. 1 and 2 illustrate the elements of local battery subscribers' sets and may be said fairly to represent that type of equipment. With particular reference to Fig. 1, it will be seen that the receiver, and the secondary winding of the induction coil are in series with the line when the receiver is off the hook; also that the transmitter, the local battery and the primary winding of the induction coil are in series with themselves and with nothing else but mere wire in that position of the switchhook.

When the receiver is on the hook, both the receiver and the transmitter circuits are opened, while the line circuit is closed through the ringer. The generator armature would be in series with the ringer but for the fact that unless the generator crank is being turned, the long fine wire of the armature will be short circuited. The device by which this short-circuiting is accomplished is known as the "shunt" of the generator, and these shunts and shunt breakers have taken various forms under the treatment of various inventors and designers.

The design of telephone receivers of to-day is bi-polar, with binding posts for the cord concealed within the shell, except in instruments used by the Bell company, in which the binding posts are on the outside of the small end of the case. The concealed arrangement is far better, the only reason for a continuance of the exposed type being the enormous expense which would be entailed by a general change, and the impossibility of effecting any compromise between a total change and no change.

Receiver manufacture has reached a stage of excellence in which troubles are few. A principal source is damage to the diaphragm, this being particularly likely to occur in the use of sets in which the prongs of the hook are pointed and small enough to enter the opening in the ear piece. Some users of such a set are almost certain to fall into the habit of lifting the receiver too high in hanging it on the hook, and of using the receiver ear piece in pulling down the hook, in ringing for second attention on the part of the operator.

Receiver diaphragms frequently are injured in other ways, a principal cause being from rusting by perspiration from the ear. Operators' receivers often are so affected. No inspector's kit is complete without a supply of new diaphragms of proper size and thickness, and attempts to cure diaphragm troubles by other means than replacement are wrong.

Certain forms of receivers, notably the standard Bell instrument, suffer by loose splinters, shavings and dust collecting between the pole pieces and the diaphragm. If there is loose material of any sort within the receiver, it will collect at this point, by which the sensitiveness of the receiver is enormously reduced. Freedom from such troubles can be insured only by a change in methods of manufacture, but in all inspections the possibility of such material being present must be assumed, and great care exercised in cleaning the space around the coils and pole pieces, and in wiping the diaphragm and pole piece ends.

Standard of separation between pole pieces and diaphragm vary with different types of receiver. Whatever distance is settled on as the closest which is reliable, each inspector should be equipped with a gauge so that in cases of doubt the distance may be tested.

Receiver cords are serviceable as long as their conductors remain unbroken and unvarying in resistance. They are advisable for service only so long as this is true and they are externally sightly. Many receiver cords have outlived their usefulness while still intact as conductors, the trouble being the wearing out of a covering or its excessive fading.

Tests for good condition of the receiver cord as to its conductors, to determine whether they are continuous, and whether there is a short circuit, need be made only where the receiver cord is in doubt. For continuity, leave the cord connected to the receiver if the latter is known to be in good condition, and connect its free terminals to one or more cells of battery. When connecting these terminals to the battery, a click will be heard unless the cord is wholly short-circuited or one of its conductors wholly parted; but the cord may still be injured even though this click be heard. Therefore, when the terminals are firmly attached to the battery, all parts of the cord, particularly the ends where they attach to the terminals, should be moved about and bent while closely observing for sounds. If the cord be of tinsel, scraping sounds will indicate a defect which warrants its being discarded or repaired. If the cord be of wire or metal tape, clicks will be heard as the broken place makes and breaks contact.

Repairing broken receiver cords is an economy only to be decided by weighing up the costs of new cords against the cost of repairs.

Transmitter troubles, if good instruments are bought, should be fewer than receiver troubles. One of the best rules relative to transmitter maintenance is to attempt no repairs at the subscriber's station. Repairs in the shop are best accomplished by replacing broken or worn parts with new of the same type.

All that has been said relative to receiver cords applies as well to transmitter cords. To this may be added that maintenance costs may be kept down by a proper choice of transmitter designs in the beginning, those being best, other things being equal, in which there are no exposed cords.

The present accepted highest type of transmitters is that in which highly polished granular carbon is used, this being found in a carbon button of not too great dimensions with enough metal to carry away the heat generated by the current in the carbon. At least one of the button electrodes should be of carbon, and this requires to be hard, and of a high polish. The size of the electrodes, the space between them, the amount of granular carbon, the size, hardness and efficiency of the granules, are elements which determine the mean resistance in the button. This resistance, broadly speaking, is lower for local battery than for common battery instruments. There is now a tendency to use higher resistances than formerly for local battery service. Equal results being achieved, that transmitter is best for local battery use which has the higher resistance, as it is more economical in local battery current.

The induction coil merits, but will not be given here, an extended description. The proportion of its parts vary widely, but their relations and identity do not. In all forms there will be found a core of iron in some other form than a solid rod, being usually of a number of soft iron wires. Between heads on this core are wound two distinct circuits. For use in local battery sets it is customary to wind the primary nearest the core, and of a larger wire and fewer turns than the secondary, which is wound on the spool after the primary is finished. The ends of both windings are brought out to two terminals each.

As it is the object of the induction coil to transform the variations of current of the battery into an alternating current to be sent through the receiver and over the line, its action is essentially a transforming one. As the line is of high resistance as compared with the local circuit containing the battery, with the transmitter and the primary coil, the best results are secured by a high potential, and it is for the securing of this high potential relative to the low potential of the battery that the secondary coil contains more turns than does the primary. The only reason the wire in the secondary coil is of small size is that it is necessary that it be fine in order that the required large number of turns may be wound in a reasonable space.

The faults to which induction coils are subject are those common to devices containing windings. The primary and secondary circuits may become crossed, or either may be-

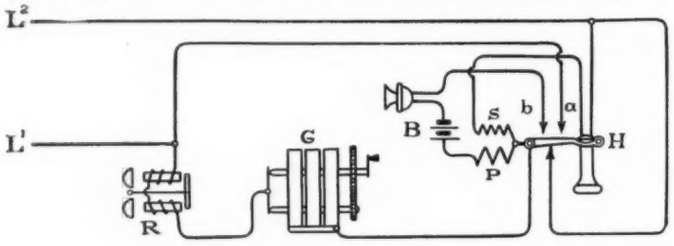



FIG. 3.

come short circuited or open. Tests for crosses between the windings can be made most easily by connecting one primary terminal to the battery, that to the receiver, and that in turn to one secondary terminal, making and breaking this circuit at any point. An absence of sound indicates no cross. Using both primary or both secondary terminals instead of one, will indicate by a click that the winding is unbroken. Only a more delicate comparison as to the strength of the sound heard will indicate whether or not a part of the winding is short-circuited. For such a determination, the best test of the condition of the coil is a comparison of its repeating power with a coil known to be good.

The battery of a subscriber's set of this type may consist of one or more cells of any type. By far the most widely used form is the dry battery, which is a mere variation of the old familiar sal ammoniac cell. In a zinc cup are contained a carbon plate and a filling of black oxide of manganese and sal ammoniac, with other materials to approximate dryness. Prices of dry batteries are low enough today to warrant their use to the exclusion of all other forms for general substation purposes. The principal requirement of inspection is to be sure that the battery connections are thoroughly well made and no visit to a substation should fail to accomplish this. All things considered, the best rule

FIG. 4.

relative to the possible further usefulness of an equipment of cells is to place new ones in case of doubt, and apply tests in the shop. As the variety of tests possible is considerable, and as all are approximate, the best method is one which will prevent too great waste of batteries on the one hand, and too long use of defective ones on the other. A sufficiently extended treatment of that subject is postponed to another portion of this series.

Of the four principal elements of a talking circuit in a substation, receivers and induction coils are those which are subject to damage by lightning. No protective device for a substatiton to be used in the country or the outskirts of a town, is complete without an efficient lightning arrester, and even with the best obtainable protectors, instruments occasionally will be damaged.

As the talking circuit is open when the receiver is on the hook, it is a matter of wonder on the part of most new inspectors that the telephone instruments are injured by a lightning discharge at such time. The reason is that, with most types of apparatus, and particularly in the circuits of bridging bells, the impedance of the receiver and induction coil secondary, in series with an actual air gap at the hookswitch, is less than the impedance of the actually closed path through the ringer. This being so, because the lightning discharge is of very high frequency, both receiver and induction coil may be damaged beyond repair by such a discharge, while other parts of the equipment remain unharmed.

A comparison of Figs. 1 and 2 will show that as to the features of the generator armature and the ringer being in series with the line, while the generator is in action, and of the ringer only being in series with the line when the generator is not in action, the receiver being on the hook in both cases, they are alike. Their differences are in the relation of the induction coil conductors to each other and to the elements of the switchhook.

In Fig. 1 the primary and secondary terminals are joined together and to a switch contact. When the hook is up the transmitter circuit will be closed by contact of the points *a* and *b* with the hook lever. The transmitter circuit thus really includes two connections, made by the contact with three pieces of metal. True, these pieces are usually platinum at the point of contact, and thus least affected by corrosion. All such contacts, however, are not platinum faced, nor are all platinum contacts absolutely proof against the

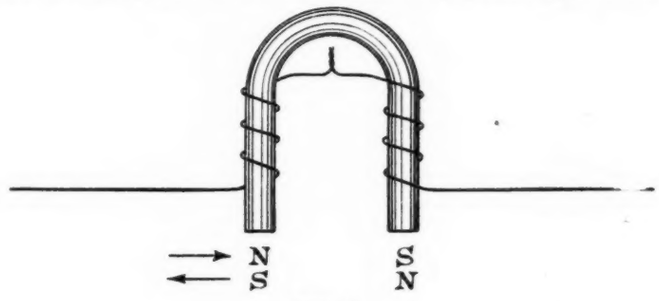



FIG. 5.

loosening of the platinum. Fig. 2, therefore, possesses a slight advantage in that the local battery circuit, in which variations of contact produce by far the more disturbing noises, contains but one hook contact between two pieces.

In other respects than those of contact making, and of possibly damaging the receiver diaphragm, the hook switch is relatively a simple mechanical element. In choosing types, however, attention should be given to the stiffness of the contact springs and the retractile spring. The hook should move freely enough not to balance before reaching its lower stop. In desk stands the hook should be held firmly enough against its upper stop, with the receiver off, so that it will never disturb its upper contacts when the stand is set down rather heavily. This is all the more important as the user of the stand ordinarily has no knowledge of the very painful sound sent to the person listening.

As the total local circuit troubles, in sets of the local battery type, form a large portion of troubles of all classes, particular attention should be given by inspectors to tracing down and removing all causes of scratching sounds. Whether these are in the local or line circuit, can be ascertained immediately by pressing open the local battery spring of the hookswitch. This is the spring, *a*, in the cases shown in Figs. 1 and 2, and with this spring open one should still be able to hear anything going over the line. If the scratching noises cease when *a* is open, the trouble is in the local circuit. If they remain, they are in the line circuit. In the latter case, short-circuiting the main binding posts, $L^1$ and $L^2$, should produce silence.

Fig. 3 shows the third arrangement of the elements in a local battery set. While all that has been said applies with equal force to this arrangement, it will be seen that there is but one circuit whichever is open, and that is the local battery circuit, which essentially requires it. The interchange of the ringing circuit for the listening circuit is accomplished merely by short-circuiting the circuit which is not required. In practical experience there is little difference, as it was not the presence of contacts in subscribers' sets which made them faulty, but the presence of contacts without platinum, which form, at the time of the invention shown in Fig. 3, was the universally prevailing one.

The ringer is an essential half of the ringing circuit portion of such a set, and is the more important as it appears in all sets, whether arranged for local or common battery calling. It is recommended that the following development of its action be studied, as the prevention and cure of faults which require more than a loose understanding of its principles.

Fig. 4 is intended to represent a simple bar of iron with a winding of one direction throughout its length. The gap in the middle of the bar, which divides this winding into two parts, one near each end, is intended merely to mark the fact that the winding need not cover the whole length of the bar, and still will be able to magnetize the bar when the current passes through it. The direction of the current is indicated by the arrow points, the magnetism produced by the current in this direction with the winding shown,

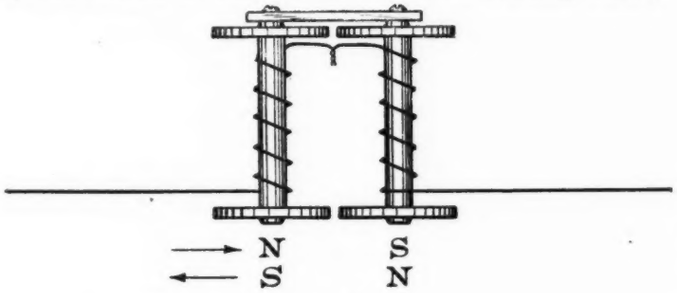



FIG. 6.

being indicated by the letters at the ends of the bar. These letters, S and N, indicate the direction, south or north, in which that end of the bar would point if hanging free while magnetized.

In Fig. 5 is shown what is intended to be the same bar with the same winding upon it, but bent into a U form exactly as if it had been grasped in the hands and bent without further change. The magnetic polarity of the pole is, as indicated, of the direction shown by the arrow, and a reversal of the current direction will transpose the polarity.

Fig. 6 is the electrical and magnetic counterpart of Fig. 5. The fact that the magnetic circuit is not a single iron bar, but is made of two cores and one back piece, has no bearing on the principle, but only shows that a modification of construction is possible.

Fig. 7 introduces another thought. Forgetting that the cores are arranged to receive windings which may carry current, it is to be observed that a permanent magnet is shown touching the back piece. Remembering that if a nail or other bit of iron be held by a pole of a permanent magnet, the free tip of the piece of iron will be found magnetized, it will be seen that the free ends of the cores would both become magnetized. Further, it will be noted, and may easily be verified by experiment, that these extremities of the pole pieces will be magnetized alike, and also will be magnetized like the end of the permanent magnet which touches the back piece. The figure indicates that if the south end of the permanent magnet touches the back piece, the free poles of both cores will be of south polarity. Fig. 7 further shows that if an armature like that of a ringer will be pivoted between these pole pieces, it would be attracted by both equally when its ends are exactly equally distant from their poles. Practically, then, the pivoted armature will lie with one of its ends close to one pole piece, as it could not lie balanced with its ends equally distant from both.

Fig. 8 repeats all of Fig. 7, but adds a winding on the

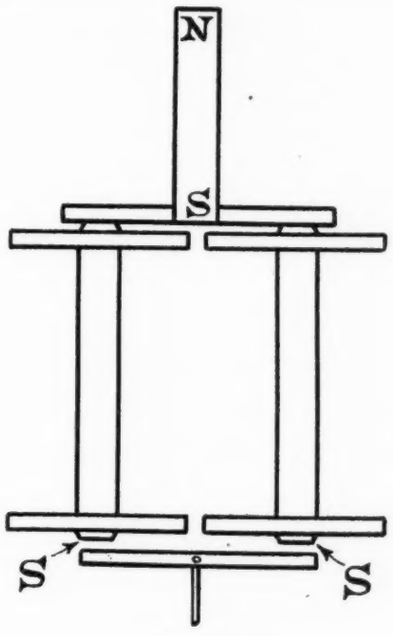



FIG. 7.

cores quite as in the case of Fig. 6. Conceiving the current to flow as indicated by the arrow, magnetism in the cores will be developed quite independently of the influence of the permanent magnet, but the result upon the armature will be a consequence of the two magnetic influences. Such south magnetism, as one free pole possesses, will be diminished, neutralized, or more than neutralized by the north magnetism produced by the current. Such south magnetism, as the other pole possesses, will be increased, doubled or more than doubled, by such south magnetism as the current produces. The result will be a difference of pull

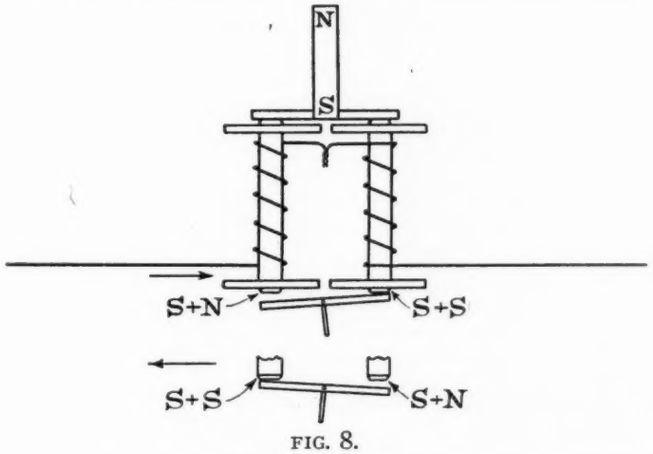



FIG. 8.

very much in favor of the pole in which the magnetisms are alike, and this difference, in working conditions, causes that end of the armature distinctly to be attracted. This strikes one blow on one of the gongs.

As the current flow actuating the ringer is an alternating one, changing direction sixteen or twenty times a second, the next impulse of current will be in the opposite direction, effecting a pull on the other end of the armature,

and causing its tapper to strike the other gong. Succeeding repetitions produce the ringing signal.

The letters and armature positions in Fig. 8 display two sets of conditions produced by succeeding alternations. A little thought will show that as the strength of the current through the ringer increases from very small values upward, the power of the armature movement will increase, but not the speed in strokes per second. This speed is governed by the frequency of the alternating current. The strength of the poles, it will be found will increase with the current strength up to a certain point, at which point and thereafter, there is no increase in the net result.

This is because the maximum effect of the current is limited by the strength of the permanent magnet, and although the statement may seem startling, it is easily seen to be true.

It is for this reason of limitation that it is important that the permanent magnet of a ringer be of good quality. Inspectors' kits should contain permanent ringer magnets, and means of testing their strength. A suspected ringer magnet may be tested by holding a good one near it or against it while the ringer is in action. A marked increase in the strength of the ring indicates a defective magnet, and a need of change.

## TELEPHONING IS THE NATIONAL CRAZE.

This is the age of telephones. The North pole, the coal supply, even the biograph and phonograph seem insignificant—the discoveries of mere babes—in the light of the achievement of the man who invented the telephone. Every function of life, social, spiritual and material, is being carried on by means of the neat little box with its marvelous cords and receiver. It is hard to say to what use the telephone is most put, but it is safe to say that the woman who has one in her home uses is quite as much and to quite as vital ends as her husband who uses it for business purposes solely. It is at once the most useful and the most abused feature of the household machinery.

There is no doubt but that telephones have saved many an hour of valuable time and many lives, but tradesmen, and especially doctors, are coming to regard them with positive terror. A Chicago physician said: "I give, every day, dollars and dollars worth of advice. If sent a bill, the patient would probably faint, but she would be sure to call another doctor to bring her out of it and to attend her afterward. People who are ill send for us once and then call us every day, often several times a day, and ask all the necessary questions for treatment. The telephone has become a really serious problem in the profession."

A well-known merchant said: "Why, we have to employ clerks to do the telephone shopping. We pay salaries to girls who take the burden of matching and selecting and planning from women who sit comfortably at home over their novels and actually shirk the responsibility of doing their own thinking."

The most aggravating use to which the telephone is put, according to those persons who have old-fashioned notions about things, is that which may be termed "social." To a woman who knows how to do things correctly it is positively maddening to have invited guests "call her up" at a late date and acknowledge the receipt of her invitation and either accept or regret it. Especially nerve-trying is it when the call comes in the middle of the dinner to which the person was invited.

The woman who gossips or visits over the telephone has much to answer for. One of the warmest places in the next world is paved with souls which have been trying to order a roast for dinner or stave off the impending visit of the plumber while she carried on her chat. It is beyond the comprehension of sane people, these eternal morning conversationals.

There is a man in Evanston who calls up a prominent business house every afternoon and asks a line of questions something like this: "Well, what's the news to-day? Somebody just said that the Atlantic won the yacht race, is that so? Has anybody resigned from the cabinet to-day? How did the Chicago-Pittsburg game come out? Anybody hurt in the trolley collision? Do you know what days the Cunard liners sail for Europe?"

On the day President Roosevelt was inaugurated, twenty persons called on as many different politicians or public men and wanted to know what his wife's first name was. Not a day passes that the telephone does not bring questions, the answers to which would involve the person giving them having lived at least a hundred years, and the queriest seems to regard it as a personal affront if the information is not forthcoming.

The questions asked at a newspaper office probably hold the record for variety. A morning paper really gets the worst of it, for it is about 11 o'clock at night that the most irresponsible men are of an inquiring turn of mind. About this time the men in the various saloons of a city get in an argumentative frame of mind. The discussion ends in a free-for-all fight or more often in an appeal to a morning newspaper. The reporter who answers the telephone fully realizes the sums of money which will change hands when his answer comes back over the wire, but even Solomon could not have kept track of all the things that these men want to know, although a good knowledge of all the sports would have helped him out. Here is one night's bets settled at a Chicago newspaper office:

"What nationality is Anna Held, American or French? (Some money went wrong that time, for the reporter said 'French' and later learned that she is Polish.) Which of the ocean races did the Valkyrie sail in? Or, was there more than one boat by that name? Well, which did they all sail in? How much did John L. Sullivan weigh when he whipped Paddy Ryan? How many rounds did it take Fitzsimmons to lick Corbett? When was the last eclipse of the moon? What is the new government building in Chicago made of? Who painted that picture of an old woman at the public library? How many bushels of wheat went out of Chicago in June? What was the total vote cast for the governor of Tennessee in 1882?" and so on ad infinitum.

But on the other side of the balance, against all this foolish and often exasperating use of the telephone, there is the suburban housewife and the blessing which the instrument is to her. No more scurrying around and going half crazy when the telegraph messenger, with his blue suit and jaunty air, brings the missive which announces unexpected guests. Mrs. Suburban goes to the telephone and calls up her grocer, her butcher, the florist, even the candlestick maker, if she wants things very nice.

She calls the man who brings fresh eggs and cream and orders an extra supply for morning; she calls the confectioner who knows exactly the proportion of nougatines which she desires in her two-pound box of chocolates; she calls the country livery stable and has a rig ordered for the train on which the guests are to arrive. She does a half hour's telephoning in a quiet nook of the library of the hall and goes back to her hammock knowing that tradesmen of every sort are hustling around to make it comfortable for her guests. An hour or so before she wants the things she calls up again to see if anyone has forgotten anything, and if an order comes wrong she calls the tradesman and makes him come and take it back.

Next day she telephones a half dozen people to come and play cards that night and meet her friends and the next day arranges boating, dancing, picnicing or golfing party by means of the same little instrument. Bless the telephone. it is the wonder of the age. t is making a careless, lazy, discourteous, but comfortable and happy, civilization.

# Questions and Answers

CONDUCTED BY J. C. KELSEY

Will you please write us how we can increase our rates without antagonizing our subscribers? We have a magneto system, common return, no party lines, and our rates are $1.50 and $1. We have a list of 170 town subscribers and sixty rural. We feel that our rates are too low. We have Bell opposition, although the Bell company has but six subscribers in town and three in the country.—G. T. and T. Co.

I have been wondering what word would do to take the place of the word used here, opposition. I don't see how a telephone system with nine telephones can be called opposition. Why, it is only a tease. If you think you are losing money, take the people into your confidence, and tell them that you must have higher rates. Talk to each subscriber personally, and get his opinion. If you find a majority willing, announce you will raise your rates. Don't let that nine telephone monopoly bother you. After the village soreheads have had their fling, the monopoly may have gained a telephone, and the advertising you get may gain you a couple of dozen new subscribers. Many a plant has raised the rates, without going to the demnition bow-bows. Remember to talk it over carefully with your entire list. It may be that you are one of those companies trying to pay fifteen per cent dividends. If you are, forget it. Never pay more than eight per cent. You know the greediest monopolists don't live in Boston, or camp out on Wall street. I hate to say it, but I am afraid that a $1.50 rate is all that a magneto common return service is worth. You may run one line to each telephone, but just the same your subscribers must necessarily be just as if on one ground party line, due to cross talk. By promising better service, I have no doubt that your rates could be raised without vigorous protest.

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We have been subscribers to TELEPHONY since our establishment, and would ask you to favor us in writing, that we may explain before our city council, of whom we are asking permission to raise our rates, why it is that the larger the exchange, the more capital it takes to operate it. If the writer's memory fails not, I think in one of your issues this matter was explained in a very clear and correct manner, and if you will address us a personal letter, from which we may obtain the necessary information for the council, we will be greatly indebted.—C. W. V.

Instead of a private letter. we will make this an open letter. It is a shame that so little data accompanies this letter. This increase in cost of operation per telephone is a general condition, after all. Ordinarily, it looks as if when one exchange office is handling all the traffic, the cost of operating per telephone should decrease. When a growth comes on, and a branch exchange is necessary, then the cost of operating takes a sudden leap, and then slowly reduces until the branch exchange is filled up. Of course, the operating charge does not ever come down to what it was in one exchange. There are many things beside operators. A building requires heat and light, and the plant requires superintendence. As your list grows, these fixed charges operate to reduce expenses until a branch exchange calls for a new set of operators, inspectors, etc. A multiple switchboard increases in cost per line, as the list grows. But it helps to give cheaper operating.

But in the question of rate raising, this point can be brought to the council's attention that the larger the list of subscribers, the more care it requires to operate it, and the greater expenses to handle the increased amount of traffic. Suppose people call ten times a day on their telephone. Suppose you have 500 subscribers. You will have to provide operators, who will have to handle 5,000 calls. Say five operators. Suppose now you double your list. You have 1,000 subscribers. Your original 500 subscribers had so much interest in each other that they called each other ten times a day. These new 500 subscribers are well acquainted with your old list, as well as the new, hence there is more talking. You have found that your old 500 are still talking ten times a day among themselves, and are also talking two or three times with the new list. The new list are talking ten times a day to their new found friends, and also two or three times to other friends. Hence, the average calls increase. For 1,000 subscribers, your exhange handles 12,000 calls, which calls for two extra operators, or a more expensive switchboard to enable the same operators to work efficiently. Suppose your list reaches two thousand. Now, your subscribers call each other fifteen times a day. You are handling 30,000 calls a day, or six times more than the original one-fourth of your subscribers originated. As you grow, your calls per telephone increase, and your cost of operating increases.

The first part of my answer assumes a city common battery exchange, all ready for business. Here things are on a large scale. It is plain that each subscriber in this case helps to reduce expenses. With high rates, each operator has a limited number of lines. As the calls per telephone increase, the operator can easily handle her share.

But the case at hand is a system which started with low rates. As a result, each operator is given all she can do. The increased calls per telephone of the growing system cannot be handled by her. They must be handled by another operator. This is why so many exchanges have found an increased burden. An increase of one telephone adds an increment to all. Your council should not only easily recognize the justice of this contention for a higher rate but they should also recognize that the increased utility and flexibility is worth more to the user. A person in a town having one hundred telephones, and paying $12 a year for the service, is really paying a higher rate than the man in a 2,000-line exchange paying $2.50. Surely, a three-ring circus demands a higher admission than the one-ring show. They deserve it. I am very sure that if your city council understands the difficulties that all Independent companies have undergone, and realizes the vast good they have done, they should be most willing to come to the relief of your meritorious enterprise, especially when it is so plain that your operating expenses have increased.

Summing up, it is this:

500 telephones, 5,000 calls, 5 operators.
1,000 telephones, 12,000 calls, 12 operators.
2,000 telephones, 30,000 calls, 30 operators.

If it were true that it cost no more to operate 2,000 lines than 500, per telephone, then 20 operators could handle the 2,000 subscribers. But it takes ten extra ones, and possibly an extra chief operator. It is plain that an extra load of $3,000 is thrown on the exchange. For 2,000 subscribers, this means $1.50 more expense per telephone. Besides, there are those ten extra operators' positions at the switchboard. with extra light, extra furniture, extra room, etc. Instead of $1.50 increase, it is nearer $3.00. You are certainly entitled to an increase in your rates, at least, a raise of six dollars per telephone per year.

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In filling out directory report blank, the writer has been wondering why there have not been more discussions in the different journals devoted to Independent telephony as to the reasonable capacity to be considered in relation to the number of inhabitants of a town when installing a plant. Almost all Independents have gone through the same experience we have in regard to reconstruction through a lack of knowledge as to what might be expected from our communities. We figured that one telephone to seven individuals would be a very large per cent, which would have eventually

made our exchange an exchange of something over 200, and the country development was originally considered at about one-third of its present size.

We had a Bell exchange here of 140 telephones that had been in existence a number of years, but is now out of existence, and we took it as a partial basis for figuring our possibilities. As it is to-day, we have much better than one telephone installed for every five inhabitants within our city limits and 375 telephones in the country within a radius of nine miles. Were we in a position to have foreseen a development of this character when we were building, it would have saved us much money, although as it is we have declared ten per cent dividends each year on our capital stock issued and at the expiration of the present year we will have $2,500 in our treasury and we have placed over $2,500 of earnings to extension account. We give you these facts for such value as they may be to you or to parties who contemplate building and have little knowledge of requirements, and the writer would be glad to hear discussions along this line, as it is all important to any inexperienced promoter of a company. Is our development here, considering population served, among the largest you know?—A. E. F.

A great mistake has been universally made, in calculating the number of telephones possible, from the Bell development. Your one telephone to five inhabitants is good, but it represents about the average of towns of your size. There are few better, and the fraction would be so small that your figures are just as good. It is a safe proposition that your list of subscribers can be increased. I would warn you not to be satisfied with the present results. They can be better. Don't pay more than eight per cent dividends. It is a mistake to do more. No man's money can earn him ten per cent in anything else, and be perfectly safe. That $2,500 in the treasury is quite a comfort. Make it more.

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Can you give me some information about the Gordon and Edison Leland batteries? What is the E. M. F. of each? The internal resistance of the different sizes? Are either suitable for operators' transmitters? If so, which is the best? Would either be suitable for replacing storage batteries in small common battery exchanges? —T. A. W.

The Edison-Leland cells have an E. M. F. of six-tenths of a volt. They have a low internal resistance, something like .05 of an ohm. The Gordon cell is comparatively the same, having .04 ohms in the six by eight size. Both have a caustic potash solution, and work well on open and closed circuits. For operators' transmitters either cell will do good work. All transmitter circuits should be so arranged as to be opened by the withdrawal of the operator's receiver plug. Transmitters certainly pull hard on a battery. You can replace storage batteries by either Gordon or Edison, although their internal resistance may be high enough to give you a cross-talk tendency. By extra sized terminals the internal resistance could be lowered to meet all practical demands. I don't believe you would get much cross-talk, practically, unless you went to one transmitter and yelled into it. Then, possibly, your operators and subscribers might hear it, or have an echo of it.

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Kindly advise me as to the following points regarding care of storage batteries such as used in the modern common battery exchange:

1. Does it harm the batteries to recharge them when the specific gravity is in the neighborhood of 1195, instead of waiting until it has fallen to 1190 or 1192?

2. With eleven cells in series I find it almost impossible to keep the specific gravity of the different cells equal. Is it harmful to have a difference of four or five points in the gravity of the solution? Have added acid to the cells which show a lower gravity, but it does not help them to any great extent. All cells are equal in voltage.

3. My instructions are to charge the batteries with a current of sixty amperes. Is it harmful to charge at a higher rate when it is desired to raise the gravity of the solution to its proper density as soon as possible?—S. A. J.

1. It does not harm any battery to charge it, even when specific gravity is 1,200.

2. If you find the gravity different in each cell, mix up the solution throughout. Trade solutions between the entire eleven, until all are the same. You make a mistake in adding acid to those cells which are low. If your cells are equal in voltage, and come to a boil simutaneously, then you have been getting your solution different by your own work. Try the mixing, thoroughly, and then note this difference. If it exists again, you had better notify some of those New York inspectors, if chloride batteries. They will examine them and put you right.

3. If your instructions are to charge at sixty amperes, why it is up to you to charge at that rate. It would not help matters, from this specific gravity standpoint. You have only to spend a few hours, giving these different cells a most complete mixing. You want to divide number one cell among the other ten. Go down the line, and after you do this your gravity trouble should not bother you longer.

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I am constructing a ninety-five mile ground line No. 10 galvanized wire from Bridgeport to Sonora (no trolley or electric line disturbances), and contemplate to exchange drops with a metallic line Sonora to San Francisco, 350 miles. By using a repeating coil at Sonora will my subscribers be able to talk direct to San Francisco exchanges? Any information or instructions from your correspondent regarding same will be greatly appreciated.—A. S. B.

By using a repeating coil of proper design you ought to be able to talk from Bridgeport to Sonora. It is quite a pull and may give you trouble. Some people claim that a quiet grounded line will give better transmission than a metallic line, owing to less resistance of the earth. I don't think this can always be true. If a fellow had salt water grounds, or something better, it might be true. I have always heard that the average ground connection used by our grounded-line people amounts to 300 ohms. If that is true, and I have seen ground connections higher, then the metallic surely wins. Your case presents difficulties. Your San Francisco terminal is common battery, with a repeater there, or a couple of condensers in series with the line, then a repeating coil to connect the metallic and grounded circuit, then your long grounded line, loaded possibly. I would not want to put many odds on your good service. By all means try it. I am too far away to give any rational answer on your conditions.

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Please answer the following questions: How close and not impair the service of a telephone company can the wires of an electric power company carrying three phase 6,600 volts come to those of the telephone company in a direct cross? Also, what impairment of service will occur where they parallel directly over the telephone company, the company using common return and grounded circuits? —G. T. & T. Co.

1. Five feet should separate all telephone and power wires. Your telephone wires should be just as high in a cross over as when in parallel, although I glean from the question that you wish to know how close will bring trouble. When a three-phase line is exactly balanced, your telephone wires could be within a few inches, and not come to grief. I mean, with each wire laying against a foreign body. Your grounded lines would offer a path which in turn would offer the power wires a stress toward earth, which would tend to unbalance the circuit. If a ground happened elsewhere on the three-phase circuit on one leg, which is removed from the telephone wire at the cross over, a breaking down strain would occur, which would exert a high potential, and communicate itself to the telephone wires, if under one inch possibly. If both power and telephone wires are in air, touching nothing, there is little danger of anything, except from a direct cross. Six thousand six hundred volts is not much of a pressure, and has not such a jumping tendency.

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We have a ground circuit telephone line seven miles long to a country store with ten telephones on it. We wish to extend it several miles below the store and take on several telephones. Now can't we put in a duplex system by making the line to the store metallic circuit, transposing, etc., and putting in a duplexer at each end, and then extending a ground circuit on past the store and bring it in over both sides of the metallic circuit as a ground circuit? Will such a contrivance work satisfactorily? Can you give us the address of some firms making these duplexers?—T. T. C.

Practically, you would have just a little trouble. It has been a dream of telephone people to use a circuit for more

than conversation, but voice currents have such a creeping, straying tendency, that you can't confine them in the circuit you place for them. Possibly, your subscribers would not object to little annoyances, and even prefer cross talk. I know of places where people don't care for metallic service, because they have cross-talk listening privileges of a whole neighborhood. To use a duplexer primarily demands balance. To balance a circuit exactly is a hard thing. Then your duplexer must be exactly balanced. So, if you succeed in getting good service with this method it is a case of luck. I know of two country lines, metallic, each with eight subscribers, which are duplexed for a third metallic circuit, and actually give service to eight more subscribers.

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What I am after is, about what is the general or a fair average estimate of the increase or decrease of installation of telephones in one exchange during a month; that is, by my wanting a list of southern exchanges was to compare the difference, if any, in the number of take outs and put ins during a calendar month in a town about the size of Jackson, Tenn.—J. W. A.

My geography is missing, and I can't find out how large Jackson is. I am going to assume that it is 15,000, and a good busy manufacturing town. I am going to assume 1,500 telephones. You should gain one subscriber every day of the year excluding Sundays. The put in should exceed the take out at least thirty every month. Some months should go ahead and some lower. A good motto, "Watch us gain 1,500 subscribers in next five years."

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I received a letter since last issue asking for a general story of the development of the study of telephone engineering, as carried on to-day in colleges. The question is asked, which interest, Bell or Independent, did the most in an educational way. Well, I am going to answer privately, as last month I heard friendly objections to the way in which the licensee telephone companies were described. To take up the education question would involve some more frenzied Bell talk. So I won't say it. We all know who has furnished the material aid to education in telephone engineering. I hear the dear old company is going to reform, have open conventions, and get out of darkness. Good! But I don't believe it.

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We have a grounded circuit seven miles long, running to a country store, and have ten telephones on it. We wish to extend this line several miles below the store, and take on several telephones. Now, can't we put in a duplex system, by making the line metallic as far as the store, transposing, and putting duplexers at each end, and then extending a grounded circuit on past the store, bringing it in over both sides of the metallic circuit as a ground circuit? Will such a contrivance work satisfactory? Can you give me the address of a firm making these duplexers?—B. F. R.

In duplexing, a beautiful scheme, which does not always make good, there are so many conditions that interfere. In the first place, your metallic circuit must be exactly balanced. You propose to run a new wire, and couple it with the old. By transposing, you may even up conditions. But it is a guess. If I knew that your line conditions were just right, I would promptly say that the duplexer would work. I don't see why you want to separate the additional subscribers from the old. Why not run the new ground wire straight out to the new subscribers. Then you would have cross talk, which would be obviated by the duplex scheme. I would certainly suggest trying it. At the last convention, Mr. Kidney of the Century Telephone Construction Company of Buffalo, N. Y., showed me a duplexer which looked good to me. It is easy to telegraph over the circuit of duplexers, but voice currents have such a tendency to cross talk that possibly you will find cross talk with the duplexer scheme as bad as if you ran a new ground circuit to the new subscribers.

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There are thirty-eight telephone circuits in Egypt. Trunk lines connect Alexandria and Cairo, and connections with other larger towns are in contemplation.

## NEED "HELLO GIRLS" AS ALARM CLOCKS.

Boston business men whose wives are away for the summer declare that they are prepared to make a good strong, vigorous kick if the Boston telephone exchange follows the lead of New York and declines to longer allow the "hello girls" to act as alarm clocks, says the Boston Journal. For many years Boston men have been wont to hail the coming of the summer months with a feeling of elation, in which there was not one cloud. It meant weeks of freedom from family cares and little glimpses of life at other seasons forbidden.

"But, John," the fond Boston wife has protested, "if I go away and leave you how will you ever wake up in time to go to work? You know what a heavy sleeper you are, and how many times I have to call you."

"Never you mind," replied husband, the gentle josher. "You need a vacation, dear, and I'll get to work on time if I have to sit up all night. You've babied me too long. I'll wake up all right, you'll see."

And hubby has. In fact he has been to his office throughout the summer on better time than usual, for the first thing he does on reaching home is to take down his telephone.

"Hello, girlie," he gurgles to the sweet voiced operator at the other end. "I want to get up at 6:30 to-morrow morning. Will you be so good as you sound and ring me up then? If so there will be something in your stocking about Christmas time. Ever go to the theater?"

That's the way it begins. The telephone girls are an accommodating lot, but even if they were not there would be trouble if they failed to awake several thousand Bostonians every morning of the summer, for here it is a rule of the company that they accommodate patrons.

Of course, complications sometimes ensue. Jones' wife may return unexpectedly for a couple of days. Jones has told the night operator to call him every morning and has indulged himself in jollying her not a little.

The next morning the telephone rings. Horrified hubby sits up in bed in dazed surprise, while Mrs. Jones goes to the 'phone.

"Hello," says Mrs. Jones.

"Hello, pet," comes back in a woman's voice. "Hurry up and get up. I've been ringing for you long enough."

After that if Jones can get an explanation accepted he will go down town and buy drinks for the entire club.

Local telephone girls say they don't at all mind acting as "bell boys" for the sleeping inhabitants of the Hub. Along toward the early hours things get dull, and it is really a relief to be able to say something more than "number."

"Why," declared one broker, "if they wouldn't let the 'hello girl' call me mornings I'd fire the blamed instrument out of the window. It's bad enough to live the lonely life we grass widowers have to all summer without these heartless corporations getting in their work. Why, just to hear the voice of that girl tell me that it is 7 a. m. is worth the whole price of the 'phone.

"Why, no, come to think of it, I don't know that I ever did express those sentiments to my wife."

## WISCONSIN MEETING.

The annual convention of the Independent Telephone Association of Wisconsin will be held in Milwaukee December 20 and 21. The headquarters will be at the Pfister Hotel. The Wisconsin conventions have always been held in February, but the date has been changed to December, as it is considered a more favorable time. An interesting programme has been prepared and the usual large attendance is expected.

# Modern Telephony: Theory and Practice

W. H. RADCLIFFE

## CHAPTER XI.

### TELEPHONE SYSTEMS.

OWING to the ever-increasing number of telephone subscribers, special efforts have been made in many directions to effect economy and to improve the facilities of the exchange for handling calls. The more important of the special systems thus devised will now be described.

The party line system is one in which two or more subscribers can obtain service over a common line and consists of the subscribers being divided into groups, each group being connected on one line leading to the exchange. The wiring of the bells in the subscribers' instruments, and their connections to the line, should be such that the operator in the exchange may signal any one of the subscribers without disturbing the others. Individual or selective signaling can thus be obtained on a line, the cost of which is small in comparison with that necessary were each subscriber given a separate circuit.

In the Barrett, Whittemore and Craft party line system it is usual to allow six subscribers on a line; in this case each subscriber's instrument is connected in the same manner to the line wires, and a ground connection is also made to the ringing circuit at each instrument. At the exchange switchboard there is a ringing key for each of the six subscribers' bells, and by operating any one of the keys current will be sent around a certain subscriber's bell magnet so as to cause that bell to ring; owing to the current traversing each bell circuit in a different manner, however, it will ring only that bell for which it is intended. The ringing current is generated in the exchange from three sets of batteries, each set comprising eighty-five cells. By means of three ringing keys each of the three sets can be connected to the line differently, and with the three remaining keys for reversing the direction of the current in each connection, the six different signals are obtained.

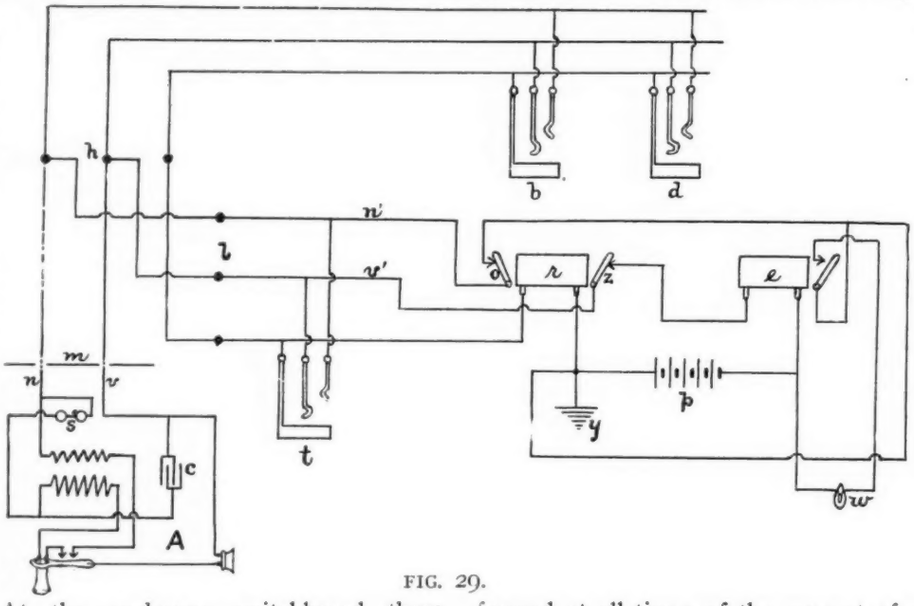


FIG. 29.

When this system is to be used in connection with the common battery system described later on in this chapter, high resistances are used in series with the bells and pulsating current is employed to ring them: the condensers usual in the subscribers' instruments may then be discarded, but the strength of the ringing current must be made such that it will not operate the line relays at the exchange.

Two party line systems may be connected either on grounded or complete metallic circuits. In the former case condensers are used in series with the bells which are themselves shunted between the line and ground, and alternating current is sent out from the exchange either on the tip circuit or sleeve circuit depending on which subscriber is wanted. In the latter case, alternating currents of different frequencies are used to operate the bells, each of which is connected with a condenser and an impedance coil on a complete metallic circuit. Owing to the different effective resistances offered by this coil to currents of high and of low frequency, either bell may be operated at will by using currents of 20 cycles and 60 cycles, respectively. It may be well to state that any one of four parties may thus be signaled if their instruments be connected on a grounded circuit.

A modification of the party line system is that in which the subscribers' instruments, without condensers or impedance coils, are bridged or shunted across the line wires. Each subscriber is then assigned a given signal consisting of a certain number of rings which he is to answer. In this system all of the subscribers' bells ring whenever a party is called, and in ringing up the central office the same signal is employed by all.

The selective system has for its object the equal distribution of the business in the exchange, among the operators. Each incoming call is received by one operator who switches the same into that section of the switchboard which appears the least busy. The operator whose business consists in switching the calls, keeps informed at all times of the amount of work being done by each of the other operators, and she occupies a separate section in full view of all parts of the main switchboard. She is thus enabled at all times to see the number of plugs in the jacks of each section, and so to fairly distribute the calls.

The automatic system is that in which the connections between subscribers are made automatically in the exchange. Telephone operators are therefore unnecessary in this system. The apparatus in the exchange is extremely complicated and limited space prevents a full description of its details; briefly, it consists of a train of tooth wheels actuated by electro-magnets which, in turn, are controlled by keys or cranks at the subscribers' telephone instruments. Mounted on the face of each telephone instrument are a number of figures arranged in consecutive order from 0 to 9, inclusive; also a movable key or crank with which the number of the desired subscriber may be represented by these figures. The movements of the key or crank in thus constructing the desired number, close different circuits, and thereby operate the proper electromagnets in the exchange necessary to complete the desired connection. Aside from the signaling apparatus, the subscribers' instruments do not differ in appearance from those used in other telephone systems.

Intercommunicating systems, like automatic systems, require no operators, but they are not automatic in action and are limited to a small number of subscribers located within a contracted area. Terminals to each telephone of the system appear at each subscriber's instrument where the desired connections are made by the subscribers independently of any central exchange. If, however, connections with the outside world are desired, an operator's services are necessary.

The common battery system in which both talking and signaling current is supplied from a storage battery at the exchange, in place of primary batteries and magneto-generators at the subscribers' instruments, is now considered the most economical and practical method of operating large exchanges.

The subscriber's line circuit in this system is shown in Fig. 29, the wiring in the telephone instrument being drawn in at *A*. It is seen that this part of the wiring is the same as that in a local battery telephone instrument, with the exception of the 2-microfarad condenser *c* which is connected in series with the 1,000-ohm bell *s* across the line wires *n* and *v*. In addition to this the receiver is wound to a lower resistance than that used in the local battery system. The main distributing board at the exchange is represented by *m*, and the intermediate distributing board by *h l*. The jacks used consist each of a brass ring and two brass springs; two of the multiple jacks are shown at *b* and *d*, and the answering jack at *t* connected as in the regular multiple bridging board. A line relay *e*, wound to a resistance of about 100 ohms is normally connected in series with a 24-volt battery *p* across the line *n' v'*. This circuit, however, passes through the armatures *o* and *z* of the cut-out relay *r*, so that the operation of *e* is controlled by the operation of *r*. The cut-out relay *r* is wound to a resistance of 40 ohms; it is connected to the rings of the jacks and to ground *y*, as shown. When the line is not in use the conditions represented in Fig. 29, exist. If, however, the subscriber at *A* desires a connection he removes his receiver from the hook, which thereupon flies up and closes the circuit through the battery *p* and line relay *e*. The armature of *e* is then attracted and completes a circuit between *p* and the ½ candlepower line lamp *w*, the latter of which lights and thus signals the operator. The hook if moved up and down by hand can also be used by the subscriber to signal the operator, even when a connection is up, in case he desires another number or wishes to notify the operator of a wrong connection. The lamp *w* in each subscriber's circuit is mounted immediately above the answering jack *t* of that circuit, so that the operator is thus aided in finding the jack to answer the call.

The operator's circuit is shown in Fig. 30. The answering plug *a* and the calling plug *c* have each three contacts; the tip and upper sleeve of *a* are connected, respectively, with the tip and upper sleeve of *c* through the two halves of one side of a repeating coil, *i x*, these two halves in each case being joined through the 24-volt common battery *b*. As the tips and upper sleeves of these plugs when inserted in the subscribers' jacks connect their respective talking circuits, the battery *b*, consisting usually of eleven storage cells in series, supplies all the current necessary to operate their transmitters. The repeating coil *i x* consists of an iron core on which are four windings of about 3,300 turns each; the inductive action between these coils transmits the varying current caused by talking, from the one subscriber's line into the other.

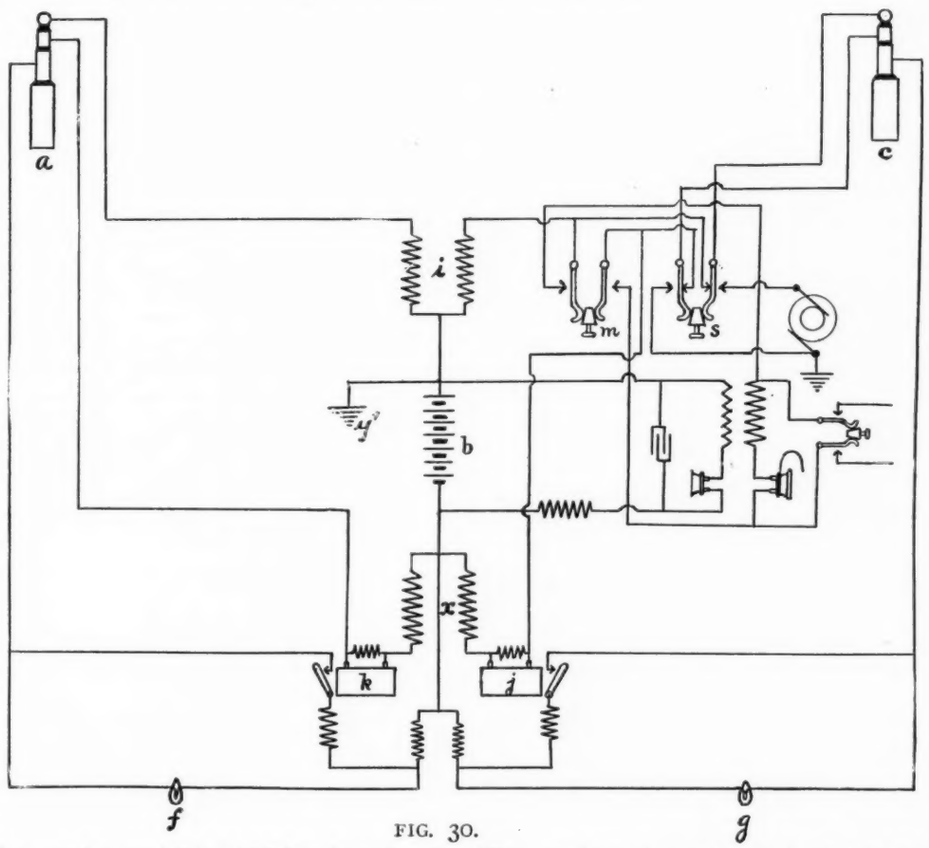


FIG. 30.

It has already been shown how the line lamp *w*, Fig. 29, lights upon a subscriber removing his receiver from the hook. When the operator introduces her answering plug *a*, Fig. 30, into his answering jack *t*, Fig. 29, current from the battery *b* travels from the lower sleeve of *a* to the ring of *t*, through the cut-out relay *r* to to earth at *y*, and back at *y'* to battery *b*. This current causes *r* to attract its armatures *o* and *z* and thus extinguishes the line lamp *w*. The operator upon learning the connection wanted introduces her calling plug *c*, Fig. 30, into the multiple jack of the desired subscriber's line, whereupon the lamp *g* on that side of the operator's circuit lights and remains bright until that subscriber removes his receiver from the hook. While the subscribers are talking the lamps *f* and *g* are out, due to the action of the relays *k* and *j*, but upon either subscriber hanging up his receiver the lamp on that side of the operator's circuit, lights. When both subscribers have hung up their receivers both the lamps *f* and *g* are lighted, and the operator is thus notified that she may remove the plugs from their jacks. The lamps *f* and *g* are called supervisory lamps, and as seen they serve the same purpose as the clearing-out drops in the local battery system. The listening and ringing keys are shown in Fig. 30 at *m* and *s* respectively, each being connected to apparatus which the reader will recognize from telephone circuits already described. To simplify the drawing these two keys are shown separately, but in practice they are combined into one piece of apparatus and both are operated by a common lever. The automatic supervisory system is but a modification of the common battery system.

# Decisions Affecting Telephony

G. W. HAND

CARE REQUIRED OF THOSE HANDLING ELECTRICITY—RULE IN CONNECTICUT.

ONE of the older cases on the above subject is found in the reports of the Supreme Court of Errors of the above state for the year 1896. A lineman in the employ of the electric lighting department of the Central Railway and Electric Company of New Britain had received instructions to ascend a certain pole for the purpose of removing a telephone wire in use by the company which was no longer needed. Certain span wires passed over a highly charged trolley wire and were attached to the pole up which the lineman had been ordered to ascend. A support wire was also attached to the pole in question and ran from it to the ground. Eye-bolts extended out from the pole at the respective places of fastening of the different wires. As the lineman ascended to the first eye-bolt he took hold with his left hand for support and then reached over with his right and gripped the second eyebolt which held the support wire. Instantly he received a shock of electricity and fell to the ground and was injured. The span wire frequently came in contact with the trolley wire but it was a rule that artificial insulation was supplied to protect the span wires from becoming charged. At this particular place a defect in the insulation existed which allowed the electricity to escape into the span wire. Several days before the accident the defendant company had received notice of the dangerous condition of the wires at the point where the injury occurred but had made no effort to find out what the trouble was.

The above facts were the basis for the following statement of the law which the court applied in fixing the liability: "In its brief the defendant claims that, in finding gross negligence in the construction of the defendant's wires, the court erred in measuring the legal duty of the defendant by an erroneous standard. The trolley wire, as used by the defendant, is charged with an agency of exceeding danger to life, and is capable of communicating such deadly quality to any wire or conductor of electricity that may come in contact with it. When the legislature authorizes a corporation to use such an agency in the public streets, the law implies a duty of using a very high degree of care in the construction and operation of the appliances for the use of that agency, requiring the corporation to employ every reasonable precaution known to those possessed of the knowledge and skill requisite for the safe treatment of such an agency, for providing against all dangers incident to its use, and holds it accountable for the injury of any person due to the neglect of that duty, whether the person is or is not one of its own employes. This standard of duty was correctly applied to the facts as found by the court below. The method of construction in connection with the failure to insulate the span wire was a violation of the duty imposed on the defendant by law."

*McAdam v. Central Railway & Electric Company, 35 Atlantic, 341.*

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INJURY CAUSED BY CHILDREN THROWING BROKEN TELEPHONE WIRE OVER ELECTRIC LIGHT WIRE.

Some children were at play in Spring street in the city of Muskegon, Michigan, and were engaged in throwing a ball and chain up against the overhead wires of a certain telephone company and those of the Muskegon Traction and Lighting Company. Finally, the chain became fastened around one of the telephone wires and in the effort to get it loose the latter was broken. The children then took one end of the broken wire and fastened it around a tree near by thus leaving one end dangling. Some of the others took the other broken and longer end and making a kind of loop commenced swinging it around in a circle and against the overhead wires, to hear the noise, as one boy afterward said. A house nearby had lately had a telephone removed from it, but the wires connecting the instrument had not been removed. Their ends in the house had been wound together and the two exterior parts passed along the street in which the above incident occurred. In the manner above described the broken telephone wire was finally thrown over the electric wire and one and another of the children received slight shocks at the end of the short wire, the current presumably having been carried from the long end onto the wire leading into the adjacent house and out again to the wire wound around the tree. Finally one William Stark, a boy of ten years concluded to try the experiment. He was asked by his mother and sister not to do so. Saying, "Watch me; I am not afraid," he took the wire and received a very serious injury as a result. Suit was thereupon brought, alleging liability on the part of the electric light company in the following language: "That the injuries complained of were caused by the defective and unsafe construction and maintenance of such wires and the defective and unsafe stringing of the wires of the defendant at the place aforesaid, and in permitting and maintaining said wire too near the surface of the ground at the place aforesaid, and in allowing the wires herein designated as telephone wires to be and remain on and connected with the poles on which was strung the wires through which the defendant was transmitting a dangerous electrical current." There was some testimony that the light wires at different places showed defective insulation and presumably the telephone wire touched at one of these places. An ordinance of the city provided: "All such poles and wires shall be put up under the supervision of the chief engineer of the fire department of said city but no wires shall be put up over the fire alarm telegraph wires, nor shall any wires be put up within twenty-five feet of the ground in any street, alley, or other public ground of said city." This ordinance was offered in evidence and testimony introduced to show that the wires in question were not the required distance from the ground.

The foregoing statement of facts will render clear Justice Ostrander's opinion in the case: "It is not apparent that the requirement, by ordinance, that wires should be supported twenty-five feet from the ground was based upon any idea of public safety. Failure to comply with this provision of the ordinance is not the negligence charged. If it was, it is not to be presumed that it contributed to or caused the injury complained before the telephone wire was broken does not appear, nor does it appear whether it is possible, or, observing proper rules, usual, to prevent some exposure of copper wire of the size and kind, in the making of splices. Whether the substance with which the wires were covered could or probably would be removed by being struck by the telephone wire, as it was swung against it, does not appear. It is, however, decisive of the case that plaintiff has conclusively shown a condition and relation of things which as to himself and the public generally was safe and harmless if not interfered with, has shown neither invitation or inducement warranting or excusing interfer-

ence, and has just as conclusively proven an interference, participated in by himself, the character and the results of which were not to be reasonably apprehended or guarded against. Whether or not, under the circumstances of this case, we apply the term "trespasser" to one of the plaintiff's years (Trudell v. Ry. Co., 126 M. 73) he was certainly a wrongdoer who but for his acts of wrong doing would not have been injured. Indulging the presumption that plaintiff was not aware of the danger of seizing the telephone wire, does not operate, of itself, to charge defendant with the responsibility for what occurred. Neither the distance of defendant's wires from the ground, nor the fact, if it was a fact, that one of them was defective as to insulation, can be said to be the proximate cause of the injury." The judgment of the lower court which was directed against the claim of the injured boy was accordingly affirmed.

*Stark v. Muskegon Traction & Lighting Company, 12 Detroit Legal News, 550.*

INCOMPETENCY OF SERVANT AS GROUND OF LIABILITY.

An interesting suit discussing the rule of law in cases of liability for injuries resulting from the incompetency of servants of the employer where the latter did not know of the incapacity of the servant, has recently been decided by the Iowa courts. The facts were, that a company had entrusted the work of repairing a certain defective line of wire to an employe, and as a consequence of his action in endeavoring to mend the wire, one, Scott, received injuries from electricity conveyed from the wire. Suit was brought to recover damages on the allegation that the employer was liable for the results of the actions of Scott on account of his incompetency. The company answered that it did not know of such incompetency and endeavored to make such want of knowledge a defense. The courts, however, held that the company could not be relieved on this ground. The rule of law in regard to the degree of care required by companies handling electricity was also stated in the decision to be that companies are liable for the exercise of *great care.*

*Scott v. Iowa Telephone Co., 102 N. W. 432.*

TELEPHONE POLES DANGEROUSLY NEAR RAILROAD TRACK.

A Tennessee case involved the following facts:

One, Moore, a conductor of the Chattanooga Electric Railway Company, was leaning out of the rear of his car to see whether his trolley wheel was properly adjusted upon the speed wire, and in so doing reached over too far and came in contact with a telephone pole placed about thirty-four inches from the rail of the car line. He sued the electric company for damages on the theory that it was negligent in allowing the poles of the telephone company to be placed so near its rails as to be dangerous to its employes in operating cars. The conductor knew of the presence and proximity of these poles and had often seen them, but evidently did not have them in mind when he was struck. There was ample opportunity for him to adjust his trolley wheel from the center and rear of the car platform, but this he failed to do. The following language in summing up the law in the case is so clear that we quote verbatim. It will be observed that the telephone pole was placed upon premises upon which the electric company had a franchise to operate its cars. The telephone pole upon which Moore was injured was on land not belonging to the electric company, but was on the public highway over which the electric company had no authority. There was no obligation on the part of the electric company to abate these poles as a nuisance. It had no authority over them or anything to do with them more than any other citizen would have. The Court said:

"If anyone creates a nuisance upon a public highway he is primarily liable to anyone who is injured thereby, because he has violated his duty as a member of society and has been guilty of a wrongful act for which he is primarily liable. But no citizen is under legal obligation to remove a nuisance from a public highway notwithstanding he may know it is calculated to do injury to a traveler on a highway if it is allowed to remain there. To make any man liable for tort he must have done, or omitted to do a duty imposed upon him by law. In the absence of such a duty there is no liability. The law imposes no duty upon the defendant to remove a nuisance in a public highway which it did not put there and has nothing more to do with than any other citizen."

It was therefore held that the electric company was not chargeable with negligence in permitting the telephone poles to be erected on land not owned or controlled by it, although the poles were so near the track as to be dangerous to employes operating cars.

*Chattanooga Electric Ry. Co. v. Moore, 82 S. W. 478.*

LICENSE TAX ON POLES AND WIRE IN PENNSYLVANIA.

In an action to determine the validity of a borough license tax on poles and wires it was held in error to reject as immaterial and irrelevant offers of a telegraph company to prove the actual cost or value of its property in the borough; the space occupied by each of its poles, "This to show that this property is unreasonably taxed;" the value of abutting properties and the rate at which they were taxed; the cost of reconstructing the line through the borough; the ordinary depreciation of such a line and the present value of the line; the license fees imposed by other cities and boroughs; the capital stock; bonded indebtedness; net earnings, and the number of poles and miles of wire in the entire system of the company.

The law as above stated is in conformity to the general rule which has been so often stated in this publication, that a license tax is invariably held valid when its purpose is to obtain revenue for purposes of inspection and under police power, when such revenue does not exceed the cost of inspection and is not used for other purposes. The law seems to recognize the right of municipalities to impose on electrical companies the duty of paying the expense which municipalities so often incur in making examination of their poles and wires to see that they are kept in a proper condition of safety.

*Schellsburg v. Western Union Telegraph Company, 26 Pa. Super. Ct. 343.*

## FORGOT WHAT ELECTRICITY WAS.

A Denver newspaper devotes a large space in an unavailing effort to answer a correspondent's question, "Does anybody know what electricity is?" says the *Portland Oregonian.* As somebody has observed, that reminds us of a story.

There is now in Princeville, Oregon, a lawyer who, some years ago, was a college student back east. One day in the classroom the subject of discussion was electricity. This student had read all he could find in his textbook about electricity, and considered himself primed for the occasion. The professor opened the ball with this direct question, flashed peremptorily at this particular student:

"Mr. Blank, can you tell us what electricity is?"

Mr. Blank squirmed in his seat, hemmed and hawed for a time, and finally admitted:

"I did know, professor, but I've forgotten."

The professor gazed at the student with an expression of unspeakable sorrow. Then he said sadly:

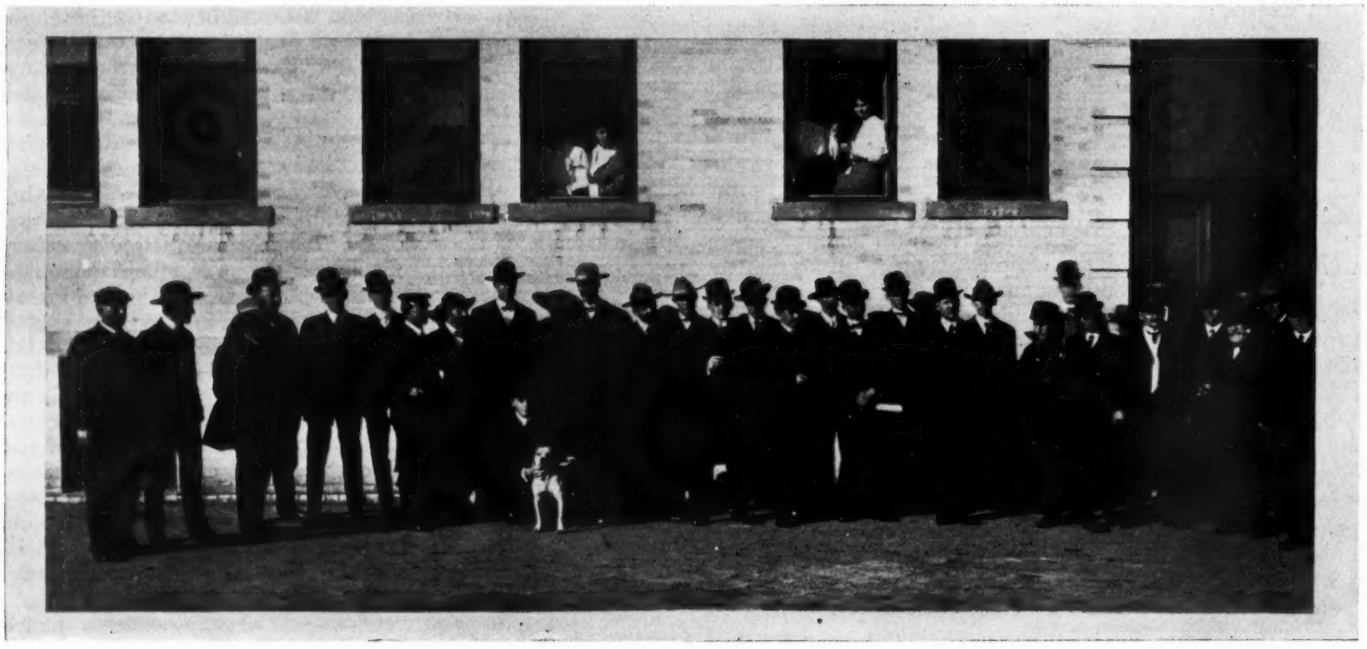
"Mr. Blank, you do not know what you have done. Alas! what a sad loss to science! You are the only man that ever lived who has known what electricity is—and you have forgotten."

# Nebraska Telephone Convention

W. J. STADELMAN

THE Nebraska Independent Telephone Association met in Hastings, November 14, in a special session on the call of the president, the object being a special consideration of the toll association and clearing house proposition for the state. Most of the members arrived early, but the president, W. E. Bell, of York, and others, arriving late in the afternoon, business was not commenced until their arrival. About three-thirty the assembly was called to order by President Bell. The secretary being absent, Mr. Mattison, of Lincoln, was elected secretary to act until the state meeting in January.

Mayor Miles, of Hastings, was introduced, who heartily welcomed the telephone men to the city. He said he liked Independent telephone men because they were men who did things, and were men of enterprise and push. He told them to take the city but to return it as good as they found it. If perchance they got into trouble, to go to a telephone, and if, happily, they ever got central (the Bell), and then possibly got him, he would try to help them out.



DELEGATES TO THE NEBRASKA INDEPENDENT TELEPHONE CON VENTION, HASTINGS, NEBRASKA, NOVEMBER 14, 1905.

Not all of the participants in the program being present, W. J. Stadelman, of Kearney, then read the following paper on "District Meetings."

MR. STADELMAN'S PAPER.

The secret of success in big undertakings is perfect organization, and since the Independent telephone movement has grown to be a big undertaking, organization is important and the accentual issue before the operators.

A perfect state organization is almost impossible as long as the telephone companies are so scattered and are dependent entirely upon their own resources for support, owing to the scarceness of toll lines to furnish a closer relation and an interchange of business. Therefore, the only salvation for a betterment of conditions at the present time is the establishment of district associations to be governed and under the jurisdiction of the State Association.

I wish to set forth a few of the benefits to be derived from such associations. In the first place, the districts should not be divided into counties or by lines drawn across the state for in either of the above instances two or more companies doing a large toll business between themselves might be separated from their close alliance that has already been formed, by these same companies belonging to different associations. This would not jeopardize the toll business, but it would prevent the operators from becoming acquainted with the wants of the various companies within their immediate territory. Therefore, I would suggest the grouping of companies according to the manner in which they are situated or connected with toll lines. For instance, Holdrege, Hastings, Grand Island and Kearney might comprise one district, which should include all the towns tributary to these towns that can be reached successfully from the two farthest points.

The exchange operators within the district could check their through messages each morning, and thus avoid a collection of disputed messages, to be settled by a clearing house at the end of each thirty days. This arrangement would simplify matters, produce quick results, and would give the state clearing house an opportunity to handle the messages at a minimum cost.

Again, with district associations, the owners, managers, stockholders and in fact all that are interested could have frequent meetings, thereby becoming, not only personally acquainted with the wants and needs in their respective localities, but they could locate the weak places and the weak kneed and give general strength to all. Results can be produced that are absolutely impossible with only a state organization.

Maps can be easily made showing the metallic lines, whether copper or iron, grounded lines, whether farmer or toll, and all stations reached. Reports can be made giving the exact number of exchanges each company owns or operates, number of telephones, whether local or farmer, the rental received, number of miles of toll and farmer lines each company owns or that they connect with or do switching for. Also, a correct report of the financial strength and condition of each company.

Exchange operating rules can be adopted so that each and every station receives and answers alike, not only for the convenience of the long distance service, but for the local subscribers as well. On this point the Independent telephone companies are very weak and many complaints are heard from people who are accustomed to a uniform service.

Just think for a moment, what great results could be accomplished if the state was organized with six or eight districts, each with all the information completely compiled regarding the conditions, also, the conditions of the Bell Telephone Company within its district. Then in time of need, such as the procuring of the franchise in Omaha, what an easy matter it would be to correspond with each district and get the revised facts and figures that are absolutely correct.

To prove that this work can be accomplished, there now exists an association in central Nebraska that can furnish all information relative to that territory, also a correct map of the lines. This association is less than a year old and the members have been seriously handicapped in their efforts from the fact that they have been com-

pelled to plan their organization according to their own ideas, as there is no other district association in the state from which to copy. And the telephone journals, with the exception of the past few months, have not discussed state or district association in detail.

One of the most important things accomplished by that association is the binding agreement, arranged by F. W. Ashton of Grand Island and Warren Pratt of Kearney, between the companies, and I have a copy of the same which I will read.

AGREEMENT.

"This agreement made and entered into this .. day of ....., 1905, by and between the Grand Island Telephone Company of Grand Island, Kearney Telephone Company of Kearney, Hastings Telephone Company of Hastings, Farmers' Home Telephone Company of Shelton, Kenesaw Telephone Company of Kenesaw, York County Telephone Company of York, Central Nebraska Toll Line Company of York, E. C. Krewson of Elm Creek, Phelps County Telephone Company of Holdrege and Chapman Telephone Association of Chapman, Nebraska.

WITNESSETH:

"Whereas, Said parties hereto are members of the Central Nebraska Toll Association, a voluntary organization formed for the purpose of building up and extending the toll business between the various Independent telephone companies in central Nebraska with the view of destroying the monopoly now held by the Nebraska Telephone Company and competing with it in the toll business; and,

"Whereas, Each party hereto owns and controls toll lines connecting its exchange with other exchanges operated by Independent companies and is desirous of extending its business and competing with the Nebraska Telephone Company; and,

"Whereas, In order to induce the parties hereto and others to invest money in toll lines it is necessary to give assurance that no toll agreement will be made with the Nebraska Telephone Company whereby the toll lines built by the Independent companies will be robbed of the business; and,

"Whereas, The Nebraska Telephone Company is using every means and offering every inducement to Independent companies to contract with it to give it all the toll business and continue the monopoly now held by it.

"Now, therefore. BE IT AGREED, That the parties hereto, in consideration of the mutual promise herein to be kept and performed by each, shall perform the following:

"First. Use their best efforts in promoting the business of the parties hereto and assist in building up the toll business of the Independent telephone companies in the state of Nebraska.

"Second. To exchange business with each other during the life of this agreement and to build up the toll business of the Independent companies generally.

"Third. To refuse to exchange business, either directly or indirectly, with the Nebraska Telephone Company and to discontinue doing business with any Independent telephone company that does exchange business with said Nebraska Telephone Company.

"Fourth. To aid each other in the fight with the Nebraska Telephone Company whenever possible to do so.

"Fifth. To abide by the terms of this agreement for the period of ten years, and it is mutually agreed that in the event of any party hereto violating the terms of this agreement, then all other parties hereto shall contribute to a fund to be raised for the purpose of compelling the delinquent to fulfill its agreement.

"This agreement is made for the purpose of uniting the Independent telephone companies in this state and for the purpose of building up an organization strong enough to compete with the Nebraska Telephone Company and to destroy the monopoly now held by it in the toll business, and for the further reason that the policy of the said Nebraska Telephone Company has been to destroy its competitors and wherever it has done so the telephone service furnished the public has been very poor and the cost of the same has been unreasonable.

"It is further agreed that each party hereto shall execute this agreement separately, and when so executed shall be binding, whether adopted by all the parties or by only part of them.

"In witness whereof the said company has executed this agreement and caused its president and secretary to sign its name and to affix its seal hereto."

If agreements of this nature existed between the various companies, their relation would be more binding, and Bell tie-ups less frequent.

The operators in the eastern part of the state have been benefited very greatly from the fact that they are officers in the State Association, which has enabled them to meet frequently and discuss their conditions. Also, from the fact that their territory is connected with good toll service. And the same benefits could be derived throughout the state if divided into districts.

In conclusion I will say, I believe it would be a wise plan for the State Association to procure the service of some able man to canvass the state and organize it into districts.

Mr. R. E. Mattison, of Lincoln, then presented his paper, "The Traffic Association," which follows:

MR. MATTISON'S PAPER.

The Telephone Traffic Association of Nebraska has been organized on account of the inability of the various companies to get settlements on inter-change toll business.

Without a clearing house it would be next to impossible to make the majority of these settlements; for example, a call sent from Grand Island to Fairbury passes over line owned by four different companies. The originating and terminating commissions must be deducted and the balance distributed to mileage; each company receiving credit for the number of miles of line they operate, mileage being figured air line between junction points, thus making six credits and one debit in properly accounting for one message. Then consider a month's business for distribution (including calls to and from 250 different points) and you will realize beyond a doubt that settlements can not be made without the aid of a Clearing House Association.

When the Traffic Association began its work in the office provided by the Lincoln Telephone Company, at Lincoln, just two months ago to-day, we had plenty of floor space and a fair idea of what we wanted to do with it. We realized that in order for the undertaking to result in a benefit to all, it must receive careful thought and co-operation on the part of everyone concerned. We started, believing that the move,—as expressed by the words of the traffic agreement, "to promote and regulate interchange telephone service between the Independent telephone companies of the state of Nebraska and adjoining states,"—would be a success, because the principles involved were right.

The expense of the clearing house is to be pro-rated in accordance with the number of miles of message cleared, thus placing all companies on an absolutely equal basis. The cost of clearing for the first month will be much higher than in succeeding months on account of the cost of organizing and purchasing necessary books and supplies. An estimate drawn from the experience of other traffic associations indicates that the average cost of clearing for the first year will be about three cents per message, after the initial cost has been paid.

In addition to operating the clearing house the Traffic Association is making a hard fight against the sublicensing work of our opponent. We have succeeded in blocking them at several points, and I know of no fight for toll connections in the South Platte country that they have won during the past three months. If we all sign the traffic agreement and stand together, we are invincible. But this can not be done without some expense. It will cost money, and you should stand ready to pay the price just as willingly as you would pay for any other kind of protection. We insure our exchanges against fire and against cyclones. The fire or the cyclone may never come; but the danger from the common enemy is here. We must protect ourselves against the loss of our neighboring towns of our county seat or of our adjoining county. We must protect ourselves from being surrounded by our enemy and our exchange rendered useless. This can only be done by thorough organization, the protection of which is worth more than any protection that we can buy. A single lame Independent plant is a detriment to all. A failure in one affects us all. There is no enterprise in Nebraska composed of different units, that are from the nature of their surroundings, more independent, yet more dependent upon each other for success, than are our telephone plants.

I want to make it clear to you that the Traffic Association, with its double purpose,—to regulate traffic between the various companies and to secure better organization,—is going to be a benefit to every one of its members. Should our enemy be working for the toll connection in an adjoining town, a letter or a message to the Traffic Association will bring a representative to the scene to protect the Independent interests.

Good organization from one point of view means standardizing accounting systems so that any exchange may benefit by the experience and methods of another; it means standardizing of operating rules, toll signs, stationary, and toll line equipment. There is not an Independent telephone state in the Union that is not working for better organization and for standardization in every department of its work.

The various lines of development among the Independent telephone companies that I have outlined, will be advanced by the Traffic Association. To bring about the best results every Independent company in the state should join this association, or contract for toll connections with some one who is a member of this association, for singly we can be defeated; united, we can not. I trust that every one of you will give this association your hearty co-operation, and secure for yourselves the protection and benefits that are within your reach.

Mr. F. E. Ebersole, of Lincoln, then spoke on "How to Check Bell Tie-Ups," which was ably presented and illustrated with maps and data, and is here reproduced:

MR. EBERSOLE'S PAPER.

The subject, (how to check Bell tie-ups) is rather a difficult one

to handle from the fact that in almost every case, the remedy required is different.

We all realize that one of the most important things to the Independent operator, is to maintain an unbroken chain of Independent companies, in the territory surrounding that in which his exchange is located.

The Bell companies realize that one of the most vital points for attacking an Independent organization is through what they term their sub-licensee contract. The method of proceedure on the part of the Bell company is not a general plan of attack upon every Independent organization in a state or a given district, but they proceed to pick out some company located in a certain territory which is more or less tributary to all of the surrounding territory and try to secure a sub-license contract with that particular exchange. It is not material to the success of their plan that they secure the neighbor of that exchange, and, in fact, I am inclined to believe that they would rather not sub-license the additional exchanges in that immediate vicinity at that particular time. When they secure a contract in a case of this kind, they have broken the connection between several Independent companies through the fact that the toll lines connecting these several companies all center in that one exchange.

Thus they have crippled the Independent movement to a greater extent than they could have done in any other way, and you can readily see that the results obtained by them in tying up six or seven Independent exchanges scattered over a considerable territory will do more to retard the growth of the Independent movement than could have been accomplished by any other method in a much longer period of time.

The smooth-tongued, oily solicitor or sub-licensee agents of the Bell company, pick out one of the weaker companies in a territory in which they expect to begin operations and about the first move they make is to create an impression among the business men of that locality that they would be far better served could a connection to the Bell telephone service be secured, and an outlet into some large business center at some distant point where the Independent lines have at the present time no connection. Very frequently, when trying to induce some of the merchants in these towns to see the matter to the liking of the contract agent, it becomes necessary to do more than simply talk to the gentleman to get him to see matters in the proper light and the writer has known of cases, where the inducement held out to have the gentleman in question see the matter in the proper form, has been large enough to cause most any ordinary man to begin to use some influence. Soon after several people have been lined up properly, and commence to complain for this connection, the owners of the exchange are approached and alluring inducements held out to them to become sub-licensees of the Bell company.

The advantages are set forth, that will accrue to them by making such a contract such as toll line connections to New York, Boston, Chicago, Buffalo, Cincinnati, New Orleans, and a few other points where their customers will want to be carrying on extended conversations which is beyond their reach at the present time; and, as a general rule, the fact that the sub-licensed company will be able to consult the engineering department of the monopoly without cost and thereby be able to apparently better their condition by having access to this long accumulated wisdom which can be gained from that source, and many other statements which would hardly hold water, were they properly sifted out. And of course, if the Independent people who are interested in this particular vicinity take no note of what is going on with their friend and neighbor, the chances are that the Bell people are successful, with their plans after a reasonable time has elapsed, and succeed in closing a contract with the Independent company, and thereby breaking a connection of the Independent companies in that vicinity.

And, while, it is a fact that this break is generally of short duration, it requires new energy, more money, and lots of hustling to fill this gap, and which could have been expended to a better advantage in some other part of the field, and would have caused the Bell company greater grief than if expended to repair a break made by them.

One of the first things that occurs to me when I hear of some company that is contemplating tying up with the octopus is that a short while before, perhaps a year, three, or five years, this same crowd of men organized a telephone company in their particular vicinity to get relief from the very people with whom they are now considering making a business agreement. At the time they started their organization, they were in either one of two conditions. First, without telephone service of any kind; or, secondly, with the poor, inefficient, so-called telephone service at rates that were exorbitant beyond all reason, which made the telephone an expensive luxury to a few, and beyond the means of the mass of people in that community. Generally, these gentlemen who organized this company were progressive, public-spirited citizens who did so first from the fact that they saw therein a chance to make a good investment, and secondly, to help a suffering public and give them a telephone service within the reach of all the people at a rental price that was equitable to both sides.

If this plant was built in a community, as sighted first, where there was no telephone service furnished, and there are any gentlemen within hearing of my voice to-day who tried to secure telephone service in that community from the company then operating, they will know the result of their efforts along those lines. They were informed that the community was too small to support a telephone exchange; that there would not be enough people who could afford to pay the price asked to justify the company coming into the field, or they would have been there long before.

If built in a town under the second condition, where there was a competing exchange, these same gentlemen will know that at the time they started their plant the service of the Bell company was poor—in fact, abominable, in most cases; that the telephones in use were few and far between; and that the rates were exorbitantly high. They know that after they made their fight, the Bell company could afford to give free service; could afford to hold out any inducement to throttle them in their desire to benefit the general public with a first-class telephone service in that community; and they also know what loyal support the citizens in those communities gave them where they made this dual investment in a field which the Bell people claim should only be operated as a natural monopoly. And those companies who have had the backbone to stick the fight out will know that, in the end, the Bell company lost in this fight, and that during all this period there were no overtures made to them to sub-license an exchange; but that, after the fight had been won, the Bell company, as philanthropists, came to take a new turn at their throat by putting up the same old game in a new way, namely: a sub-license contract. They hope to be able to do under cover that which they could not do in the open.

It was this condition, that existed in all parts of the United States, that has brought about the advent of the Independent telephone; that has made the telephone a necessity, not only with the business men, but with the people who reside even in the rural communities; and in this country to-day the Independent people have more telephones in use than the combined Bell companies. The Bell company sets up the claim that a telephone plant cannot be operated successfully at the rates charged by the Independent people, yet it is very willing and glad to tie up an Independent telephone company to operate at these rates, and take their toll business at a percentage that is less than the actual cost of handling same, and to have them receive and deliver from the Bell company all incoming messages absolutely free of charge. In other words, they take the cream of the business, and have the owners of the Independent plant hold the sack while they harvest the earnings that have been created by the terminal facilities owned by the sub-licensee.

It seems strange that the owners of any company will give an ear to these alluring inducements held out by the Bell people after they have accomplished the purpose for which they were organized; and that, at a time when they have the enemy down and out, will allow him to come back to their camp, as a wolf in sheep's clothing, and take away the rights and prestige they have acquired, and eliminate all chances they may have had to pay a reasonable income on their investment.

Let us see what an Independent exchange could possibly hope to secure by making one of these contracts in any of the counties in this district. In the first place, the Bell company in this territory has less telephones in every county in the South Platte country than have the Independents, and when they make such a contract, thev isolate their subscribers from the balance of subscribers of Independent telephones in their territory and, instead of giving them from 1,000 to 2,000 telephones, as before, it is only possible, when they connect with the Bell, to give to them from 500 to 1,000 telephones in the vicinity, so that they do not gain anything in that direction. By reducing the number of telephones that their subscribers are able to talk to, within a radius of twenty to thirty or fifty miles of the exchange, they thereby reduce the earning capacity for long-distance service in that exchange, and as ninety per cent of the toll business is conducted within a radius of fifty miles of the originating point, they cannot hope to secure enough additional long-distance business to overcome the loss that has been made by entering into this contract.

The percentage accruing to the originating company entering into a contract with the Bell company is fifteen per cent of all money collected for toll business originating in their exchange, and they are required to guarantee the collection of all toll charges. They receive no compensation for incoming messages. Should they remain Independent, they have the advantage of a constantly increasing list of subscribers in their vicinity and a constantly added and extended toll line service, with an originating per cent of twelve and one-half per cent, and a terminating per cent of the same amount, thereby making twenty-five per cent of the gross toll business originating and terminating with them.

They have the right to build, operate and maintain toll lines of their own, and are enabled thereby to secure further earnings to their exchange, that is impossible to secure under a sub-license contract. They are forced to pay to the Bell company a rental of about fifty per cent of the costs for at least a few transmitters and receivers each year, and are turning into the coffers of the Bell monopoly, money which is taken from the state, thereby working a double injury to the community in which they are operating.

The remedies to prevent these tie-ups from taking place are very numerous, and, in fact, almost every case requires more or

less of features that were new to any preceding one. It is possible for the Independent people interested in preventing the tie-up to show to the company about to affiliate themselves with the Bell organization that, instead of gaining prestige, they are losing it, from the fact that it is a hard matter to find a county in the state where the Independent telephones do not outnumber the Bell, outside of Douglas. The toll lines they are about to connect with are, in most cases, inferior to, or, at best, equal to those that they are at the present time connected with. The interests of their friends and business associates are more or less directly affiliated with the Independent movement and it works an injury to others who have been induced to enter the Independent field through their having been there.

But this is all mere sentiment. The actual remedy lies in the organization of a long-distance telephone company in this state that will build a first-class long-distance telephone line, connecting every county in the state with every other county, and furnish the required number of circuits to handle the business; give the proper outlets, good service, and allow all companies now operating to become stockholders. Another feature that is of vital importance to every operating company within the state is to see that every company with whom they are connected by toll lines signs a contract with them for a reasonable number of years, to insure uninterrupted connection with the exchange. Had such a contract been demanded of all companies going into the field, the history of the Bell tie-ups in the state of Nebraska could have been recorded in a different manner from what it is at the present time.

If every company represented here to-day will proceed to contract with every other connecting company, they will have formed a barrier which the Bell company cannot break down and which will force all companies to receive and deliver all messages from any other company in the state.

In union there is strength, and it is the lack of this union and organized effort on the part of the Independent people of Nebraska to-day that permits these conditions to exist. We little realize what it means to have a company sub-licensed to the Bell, as long as this company is in some isolated district from our own territory; but when the matter comes home to us, and we find the fellow with the large exchange in the next county to ours tying up with the Bell company, shutting off connection, and eating a large hole in our revenue, we begin to realize it is a pretty serious matter. Had we expended the same amount of energy and time at some earlier period, or at the time we made the first connection between our exchanges, that we are willing now to expend to prevent this action taking place, we could rest secure in the thought that it is impossible for the Bell company to sub-license any of the companies connecting with us; and, in my opinion, the safest and surest way to prevent this condition from taking place is the immediate closing of contracts, such as I have mentioned, between yourselves and every company operating in your vicinity.

Mr. Stadelman made a motion, which carried, for the chair to appoint a committee to devise a plan for perfecting district associations, to report at the annual meeting in January. The following committee was afterward announced: W. J. Stadelman, F. E. Ebersole and R. E. Mattison.

The subject of "Uniform Operating" was next introduced for discussion. It was the consensus of opinion that uniform rules should be adopted and given the operators on the exchanges and toll lines for the object of better local service and more rapid and satisfactory toll operating.

Mr. Mattison also introduced the subject of accounting the toll business, and thought that the whole subject of rules for operation and accounting be handled together. It was ordered that such uniformity is desirable and the matter be given into the hands of the traffic committee to formulate and publish full rules and forms for distribution.

Messrs. Ebersole, Pratt, Taylor, Garlow and Beaver were appointed a committee on contracts to report at the state meeting in January, 1906.

Mr. Stadelman moved that the secretary correspond with the secretary of the National association with the view of the State association joining same, which was carried.

Following is a list of the attendance: A. J. Carter, Monarch Telephone Manufacturing Company, of Chicago, Sioux City, Iowa; C. L. Fisher, Automatic Electric Company, Chicago; M. E. Shipley, Hooper Telephone Company, Hooper; C. Yail, Arlington Telephone Company, Arlington; F. W. Ashton, Grand Island Telephone Company, Grand Island; F. D. Roseborough, Western Electrical Company, Omaha; H. P. Blackledge, American Electric Telephone Company, Chicago; E. V. Revell, Hamilton County Telephone Company, Giltner; Geo. W. Brown, Chicago Telephone Supply Company, Elkhart, Ind.; Wm. C. O'Connell, Western Electrical Company, Omaha; J. F. Munro, Nebraska Electric Company, Omaha; F. H. Wheeler, Oxford Homes Telephone Company, Oxford; I. J. Kusel, North Electric Company, Cleveland; D. C. Gould, Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y.; O. E. Mickey, Osceola; E. F. McCord, Bladen; E. L. Larabee, Eureka Electric Company, Genoa, Ill.; F. M. Ferguson, Sweedish-American Telephone Company, Chicago; G. MacIntyre, Illinois Electric Company, Chicago; Warren Pratt, Kearney Telephone Company, Kearney; W. J. Stadelman, Kearney Telephone Company, Kearney; R. E. Mattison, Telephone Traffic Company, Lincoln; J. M. Harris, Western Telephone Company, Lincoln; E. C. Krewson, Elmcreek; W. D. Moore, Saline Telephone Company, Friend; S. G. Peticolas, Westinghouse Electric and Manufacturing Company, Omaha; A. M. Lathrick, Glenville; J. R. Shawcross, Glenville; G. W. Abbott, Inland; Geo. W. Kimball, Automatic Electric Company, Chicago; A. W. Nunemaker, Tobias; Sam Patterson, Arapahoe; Ezra E. Shultz, Kenesaw; Dr. Lyman, Hastings; M. W. Dimery, Beaver Crossing; J. H. Ritchie, Beaver Crossing; Irving W. Pope, Omaha; J. T. Kelle, Harlan; E. L. Brown, Chester Telephone Company, Chester; W. H. Daubendick, DeWitt; E. H. Cox, Bladen; S. J. Rice, Harvard Telephone Company, Harvard; J. H. Yost, Harvard Telephone Company, Harvard; C. H. Beaver, York Telephone Company, York; A. G. Munro, Nebraska Electric Company, Omaha; W. E. Bell, York County Telephone Company, York; F. E. Ebersole, Lincoln Telephone Company, Lincoln; Frank Woods, Lincoln.

## TALK THROUGH TELEGRAPH INSTRUMENTS.

A strange thing in connection with putting in telephones in the Northwestern offices, says the Rochester (Minn.) Record, is the fact that the telegraph instruments convey the voices just as if they were telephones. Standing in the office of the Northwestern depot you will hear the dots and dashes being clicked off in double quick time, and then from near one busy little relay will emanate a voice sounding above the tireless ticking. You look under the desk and out the window, but no one is in sight. Put your ear down and locate the voices and you find that they are coming from the telegraph instrument in front of you. No receiver, no transmitter, no—and still those shrill, piping tones keep up, sounding phantom-like in the distance. It appears that the battery is so strong at division points that the telegraph wires catch the current from the telephone and the magnets in the telegraph instruments act as a transmitter. But it is all very peculiar.

## TELEPHONE FISHING APPLIANCE.

An English paper reports that a Norwegian has invented a telephone by which the noise made by fish in the depths of the sea can be heard. The instrument consits of a microphone in a hermetically sealed steel box. It is connected with a telephone on shipboard by electric wires, each sound in the water being intensified by the microphone. The inventor asserts that with its aid the presence of fish, and approximately their number and kind, can be recognized. When herrings or smaller fish are encountered in large numbers they make a whistling noise, and the sound made by codfish is more like howling. If they come near the submarine telephone their motion can be distinguished. The flow of water through the gills produces a noise similar to the labored breathing of a quadruped, and the motion of the fins produces a dull rolling sound.

# Digest of Telephone Patents

**Conducted by Edward E. Clement**

801,851—W. N. Clark. Portable Telephone.

This is a receiver holder comprising brackets on a desk stand. Patent unassigned.

801,864—E. J. Hall. Telephone System.

A simple intercommunicating system with push button calls. Patent unassigned.

801,936—Carlo Turchi. Apparatus for the Simultaneous Transmission of Telephonic and Telegraphic Currents over the Same Line.

A composite system with a metallic circuit having bridged "separator coils," double wound to split resistance and inductance, for a phantom circuit. Patent unassigned.

802,387—Owen M. Galloway and Edward B. White. Telephone Cut-Out and Switch.

A key switch for opening and closing private lines, comprising lightning arrester, springs and contacts on the outside worked by a handle on the inside of a house.

802,497—Frank B. Cook. Ground Strip for Protective Apparatus.

A lightning arrester strip with portions of the springs punched out to prevent lateral displacement of the carbons.

802,513—Louis St. J. Johnson. Attachment for Telephone Transmitters.

A punched front plate for transmitters, having openings making it a convenient card holder.

802,597—E. A. Reynolds. Selective Signaling Apparatus.

A very ingenious harmonic ringing system having a slide on each ringer acting as a stop along the length of the clapper rod and adjustable thereon. Patent assigned to Iron Telephone Company, New York, N. Y.

802,644—W. Kaisling. Telephone Desk Set.

A desk set having a Stromberg type hook switch mounted in the standard and a hollow knuckle joint on top. Patent assigned to Stromberg Carlson Telephone Manufacturing Company.

802,654—Paul C. Murphy. Telephone Directory.

A metal frame secured on transmitter mouthpiece and carrying directory cards. Patent unassigned.

802,671—H. G. Webster. Telephone Exchange System.

A two-wire multiple common battery telephone exchange system with differential cut-off relays energized when plug is in by unbalancing. Patent assigned to the Stromberg-Carlson Telephone Manufacturing Company.

802,684—Frank B. Cook. Heat Coil.

A heat coil with enlarged ends and reduced middle portion containing the winding, and an enclosing sleeve.

802,736—Frank B. Cook. Electric Fuse.

A double tubular fuse with a spring holder producing a torsional stress to keep the fuse in the circuit and make good contacts.

802,939—F. R. Parker, assignor to Frank B. Cook. Ground Plate for Electric Protective Apparatus.

Protective panel or ground plate with Cook self-soldering heat coils. The plate is formed of thin metal strips spaced apart. Patent assigned to Frank B. Cook.

803,107—I. Kitsee. Transmission of Electric Currents.

A cable formed of so-called composite conductors twisted together, each comprising one line wire from each end twisted together with their ends open, forming a wire condenser.

803,108—I. Kitsee. Electric Transmission of Intelligence.

A similar device to the last one, only the wire condensers are twisted up on boards 12 by 18 and inserted in the lines at the ends thereof.

803,109—I. Kitsee. Transmission of Intelligence with the Aid of Electric Energy.

A transmission line composed of three insulated conductors twisted together, one being open at one end, a second at the other end, and the third connected at both ends. The scheme looks fishy.

803,110—I. Kitsee. Transmission of Electric Currents.

Another twisted wire condenser, the whole line being such a wire, but having two sides or metallic circuit.

803,111—I. Kitsee. Transmission of Intelligence with the Aid of Electric Energy.

A similar scheme to the foregoing, the line composed of three twisted conductors, one of them connected at both ends and each of the others open at one end.

803,112—I. Kitsee. Transmission of Intelligence with the Aid of Electric Energy.

Another variation of the same proposition. Transmission is through capacity effects only in the twisted line wires. These Kitsee patents are all unassigned. Dr. Kitsee lives in Philadelphia, Pa.

803,199—J. S. Stone. Space Telephony.

Mr. Stone has done a great deal of valuable work in wireless. The present invention comprises means for radiating a substantially continuous train of electromagnetic signal waves, means for varying the amplitude of these waves in accordance with sounds, with a receiving system having means for selectively absorbing the energy of said waves and means quantitatively responsive to the variations in amplitude.

803,237—I. Kitsee. Electric Relay.

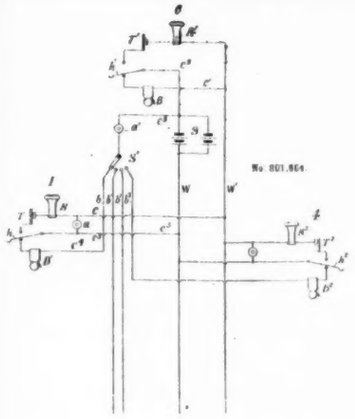
A telephone repeater or relay having a local balancing magnet which holds up electrodes so they just touch, a receiver magnet responding to impulses in one circuit to pull down the electrode which is connected in a second circuit. Patent unassigned.

803,513—J. S. Stone. Space Telephony.

Another case of wireless telephony. This is a method case, covering the development of a train of waves and varying their amplitude, and causing a responsive device to act in accordance with the variations.

803,676—F. W. Dunbar. Telephony.

A subscriber's talking circuit for common battery systems, supposed to be very efficient and without side tone. Uses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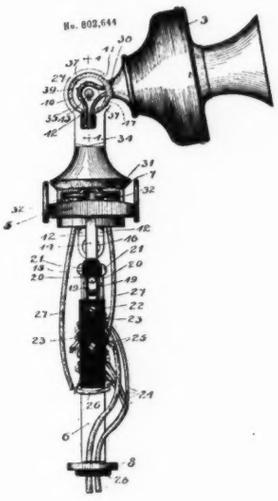
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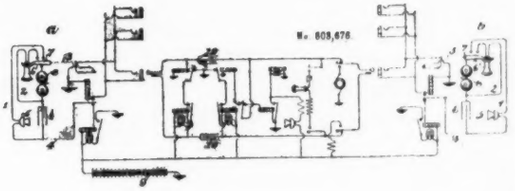
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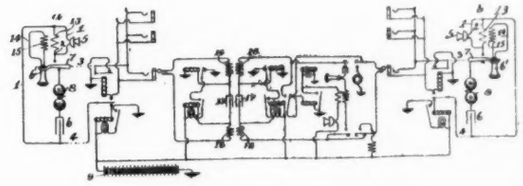

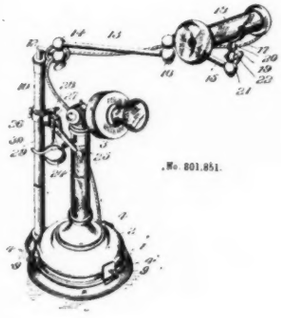
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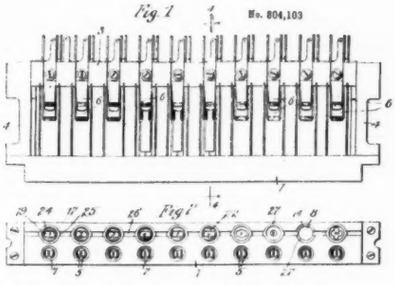
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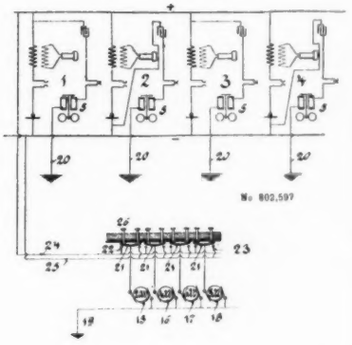
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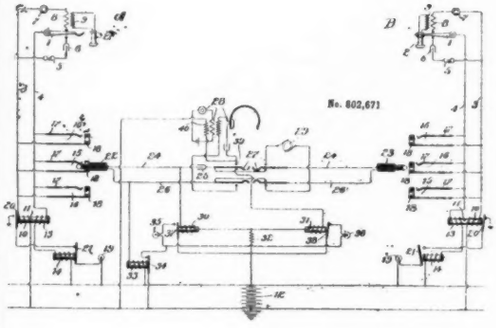
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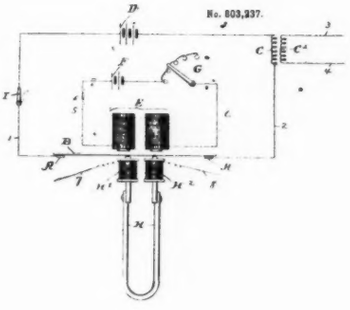
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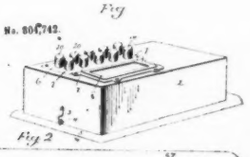
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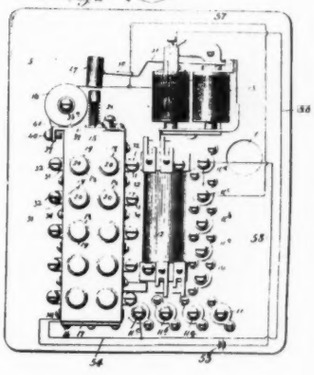

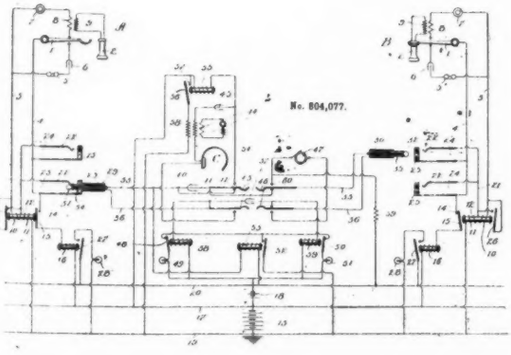
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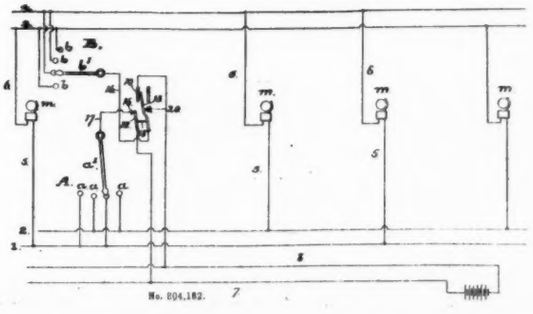
No. 804,182.

induction coils, with receiver in a local or in parallel with the transmitter. Patent unassigned.

803,856—W. A. Robinson. Telephone System.
A switch for party-line systems cutting off one way or the other when local telephone is in use. Patent unassigned.

803,881—F. B. Cook. Self-Soldering Thermal Protector.
One of Mr. Cook's self-soldering protectors comprising a metal ring with star teeth, soldered directly to a carbon button which is held in the springs and is turned thereon when the solder melts. Patent unassigned.

803,890—William Geckler. Telephone Night-Watch System.
A watchman's signal transmitter which can be plugged in at a subscriber's station, and a recorder at the central office, so the watchman can turn in his time to central during the night.

803,980—Charles H. Borden. Telephone Holder.
A desk bracket having a terminal pivoted tube carrying the transmitter, like a desk set turned horizontal. The switch hook has a rotary motion. Patent unassigned.

804,077—H. G. Webster. Telephone Exchange System.
Another two-wire multiple common battery system having differential cut-off relay and divided battery. Special test provided. Patent assigned to Stromberg-Carlson Telephone Manufacturing Company.

804,103—T. V. Davis. Telephone Switchboard Apparatus.
A strip of answering jacks with lamp jacks, mounted together. Patent assigned to Stromberg-Carlson Telephone Manufacturing Company. By an ingenious arrangement of screens different colored lights may be thrown out to indicate the class of the subscriber.

804,182—A. K. Andriano and H. Herbstritt. Metallic Circuit for Operating Signaling Devices.
A simple intercommunicating system with metallic circuits composed of going and return wires of the corresponding stations. Patent unassigned.

804,256—F. R. McBerty. Signal for Telephone Switchboards.
An interlocking pair of target signals, with circuits for the same. Patent assigned to Western Electric Company.

804,279—Anthony Van Wagenen. Transmitter.
A dial transmitter or sender for automatic systems, comprising a toothed wheel and a switch mechanically worked by it. Patent assigned to the Clark Automatic Telephone Switchboard Company of Providence, R. I.

804,280—Anthony Van Wagenen. Transmitter.
This patent covers modifications of the sender shown in the previous patent and is assigned to the same company. Claims of both are to detail of the gearing and other mechanism.

804,431—E. A. Reynolds. Telephone Instrument.
A coin box with chutes, and having a hinged top and front carrying the transmitter, and a removable portion carrying the rest of the working parts. Patent assigned to Iron Telephone Company, New York, N. Y.

804,742—B. L. Lawton. Push Button Switch Mechanism for Telephones.
This is a push button selector switch box having a latch to hold down any button that is pushed in, and a magnet to trip said latch. Patent assigned to the Connecticut Telephone and Electric Company of Meriden, Conn.

## MR. COX'S TELEPHONE.

I shall never forget my first visit to Cincinnati. Cities and city bosses were my subject then, and I thought I knew something about such things. I didn't know the worst. The train ran through the early morning sunshine up to a bank of mist and smoke, paused, as every train since has done, then slowly tunneled its way into the *cul de sac,* where the Queen City broods in gloom. I wanted to see Cox. The etiquette of my work seems to me to require that I shall call first everywhere on the ruler of the people; if he is the mayor, I call first on him; if the mayor is a figurehead I call first on the boss. Sometimes one is in doubt. In Cincinnati, immediately after breakfast I sought out the sign of the "Mecca" saloon, went up one flight to a mean, little front hall room. A great hulk of a man sat there alone, poring over a newspaper, with his back to the door. He did not look up.

"Mr. Cox?" I said.

There was a grunt; that was all.

"Mr. Cox," I said, "I understand that you are the boss of Cincinnati.

His feet slowly moved his chair about and a stolid face turned to mine. Two dark, sharp eyes studied me, and while they measured, I explained that I was a student of "politics, corrupt politics, and bosses." I repeated that I had heard he was the boss of Cincinnati. "Are you?" I concluded.

"I am," he grumbled, in his hoarse, throaty voice.

"Of course, you have a mayor and a council and judges?"

"Yes," he admitted; "but——" he pointed with his thumb back over his shoulder to the desk—"I have a telephone, too."—Lincoln Steffens in McClure's.

## THE TELEPHONE GIRL.

Here we have ladies and gentlemen, the telephone operator. Once she was a very beautiful girl; look at her now. Six months ago when she first took her seat at the switchboard she was fair to look upon and amiable to meet. Where beauty once reigned supreme now she has wrinkles. It is not her fault, ladies and gentlemen, so bear with her a while. She is the mouthpiece of the office. That is why a woman has the place. She answers more questions in an hour than Anna Eva Fay answered in a month. Her working hours are all the time. She is supposed to know the length and breadth of every river in the world, the height of the tallest buildings, the records of all the prize fighters, Lou Dillon's fastest mile, the baseball scores by innings, the winner of the fifth race at Saratoga and the quickest way to get to Europe. She must decide all saloon bets; must keep track of every member of the staff and if they are out of the office must know where they are and when they will return. She must be pleasant at all times, for she never knows when the boss will call up. Once a telephone operator advised a caller who wanted the score to buy a newspaper. The next day she was fired. She had given her advice to the proprietor. Notwithstanding all these cares the operator still finds time to manicure her nails and do a little fancy work. No, ladies and gentlemen, there are softer jobs than that of the telephone operator. List to her a minute.

"Hello! Five two two, Detroit; Long John won the third race; he is out at present; any message? Terry McGovern won the fight you speak of; No, Mme. Yale is not dead; the bidder always leads first; if you turn up a jack in cribbage you get two points—" But let us pass to the next.—*Riverside (Cal.) Enterprise.*

# The Manchester, England Telephone System

J. HANMER QUAIL

THE trunk-line telephone service in the United Kingdom is provided by the postoffice, the calls to and from cities and towns, passing through the National Telephone Company's wires to the postoffice and through the trunk-line wires of the postoffice to or from distant subscribers. In Manchester, the trunk-line switch-room is in the building used as the General Postoffice. This is an extensive modern block, 210 yards east of the Manchester Exchange. The telephone department occupies portions of the two upper floors of the building and here a well-equipped trunk-service establishment is maintained and worked. The Manchester trunk telephones came into possession of the postoffice on February 6, 1897, they being taken over as from that date from the National Telephone Company, who had previously controlled them. The service was not nearly so extensive then as it is now, the calls in March, 1897, averaging about 4,000 per day and the service requiring forty-four operators. At the present time, the calls average about 12,000 per day and there is a staff of 113 operators. Before the trunk service came under the control of the postoffice an important change was made. Switchboards of a kind preferred by the postoffice to those which the National Telephone Company had used, were substituted for the older boards, the new boards and accessories being ready by the date on which the service came under the new control.

The wires enter the building by underground conduits and are all carefully ranked and grouped in an extended wall-case or cupboard which has been constructed on one side of a main passage in the basement. At this point, at the base of the building, any wire can be "picked up," a circumstance, as events have proved, of great importance. On September 19, 1900, a fire destroyed the wires and much apparatus of the telephone department on the upper floors. The existence of the grouping cupboard in the basement enabled the staff to pick up the wires so readily, that before noon on the following day most of the circuits had been restored and were again in use. As a protection against a disaster which might at the present time overtake the wires at the point were grouped in the basement, the authorities have had a fireproof chamber constructed in the basement, to which the wires will shortly be transferred and in which they will be grouped in the most advantageous way, to admit of the quick picking-up of any wire.

The wires are brought up from the basement of the building and enter what is called the test-box and from this are distributed to the different sections according to the towns with which they communicate. Each wire is provided with a protector at the test-box. The form of protector used consists of two small plates of carbon with a disc of mica having three perforations in it, between the carbons a wire being led from one plate of carbon to earth. Any stray current will ordinarily pass through the carbon connected with the trunk wire, and then through the perforations in the mica disc to earth. Wires lying in the vicinity of known electric currents, such as sources of supply for electrical traction, are, however, also provided with a small heat-coil by which any large increase of current in the trunk wire may be rendered harmless.

The principal service rooms consist of the operating room proper in which the trunk-line connections are made, and the test-room, which adjoins. The test-room is furnished with a testing board from which all of the trunk lines can be tested, and with a full complement of testing instruments. Each trunk is carefully tested between 7 o'clock and 8 o'clock each morning, by means of a tangent galvanometer. In the event of any fault being detected, linesmen are immediately dispatched to bring the line up to normal again. Once a month each trunk is also tested by means of the Wheatstone bridge and any irregularity which is detected is at once rectified.

In the operating room the switchboards or section boards are ranged near the sides and ends of the room, sufficient space being left between the boards and the walls to give convenient access to the backs of the boards. In connection with the exchange there are fifty-two trunk sections the majority of them being fitted with five circuits each. The actual number of circuits is 235 and about thirty new ones have been authorized. It has been found that an operator cannot deal with more than four or even three of the busiest trunks and that if more than this were placed under her charge she would be physically incapable of standing the strain for a longer period than three or four hours a day. A full trunk, as it is termed, carries forty calls per day. The time allowed for a conversation or "call" in the day, is three minutes, which, however, means six minutes, the call-time being reckoned as double the nominal time, to allow of a call and the reply. Between 8 p. m. and 6 a. m. the time allowed is double that allowed in the day, the nominal call-time being six minutes and the time actually allowed, twelve minutes. The charges for the night and day services are the same, the double time of the night service being allowed for the same money as the shorter time of the day service. The charges for the trunk service are given hereafter.

Should the number of calls on a trunk increase beyond forty a day, and there be a reasonable probability of utilizing another trunk; an additional trunk would be laid down. The chief demand on the trunks is made within the business hours of the day and the officials arrange the service accordingly.

The section boards are the postoffice trunk pattern and are framed in teak. The board is upright but is provided with a sloping desk or table at a convenient height for the operator, when seated. The lower half of the board, above the desk, contains rows of switch-plug holes and small shutter indicators. The upper half of the board contains three rows of dial indicators. The desk is provided with ringing keys, switch-plug holes and microtelephone. Circuits are formed by means of short cords which have an insulated conducting plug at each end. Each section switchboard is furnished with twelve ringing keys, two rows of switch springs and two rows of visual, shutter indicators, the switch springs being in connection with the National Telephone Company's junction circuits. One row of the shutter indicators is used for recording the ringing-off of a National company's subscriber, the "ring-off" being shown on the board by a movement of one of the light aluminum shutters. The pressing of a speaking key causes a current to pass through the shutter and automatically restores it to its normal position. The second row of indicators consists of galvanometers of the National company's exchange and are used for registering a ring-off from the trunk subscriber. Ringing is performed by magnetic energy or, as it is termed in the service, "by magneto." On a circuit being opened for a subscriber the needle of one of the galvanometers is deflected and continues deflected while "call" continues. On ringing off, the circuit is severed and the needle of the galvanometer falls to its normal position of rest.

One row of indicators on the section board is connected with relays on which the two wires forming the trunk circuit terminate. The wires actually terminate in a switch-

spring but are so fixed that when the spring is in the normal position, the two trunk wires form a continuous circuit through the relay. This arrangement constitutes the principal feature of the postoffice system of trunk working, viz., the maintenance of a continuous current on the trunk lines. By maintaining a constant current through the lines, even when the trunks are not being used for conversing, the lines are considered to be subjected to a constant test, which would instantly reveal any fault or departure from normal efficiency. The action of the relay would immediately notify that such fault or departure from normal had occurred. The relays serve as watchful and sensitive detectors which instantly detect and announce any change or irregularity in the state of the trunk circuits.

In the working of trunk-line business at the section

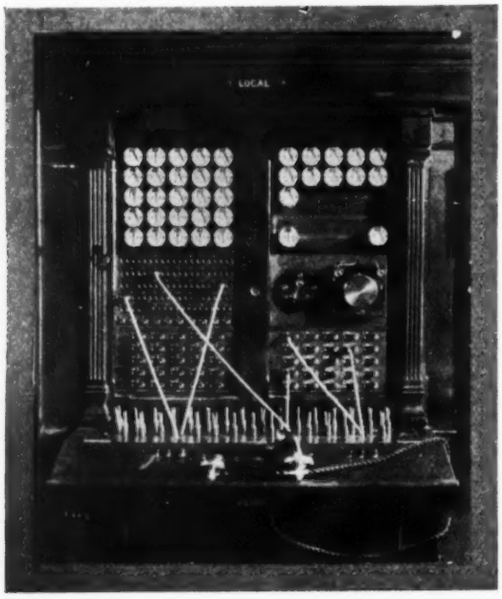

FIGURE 1.

switchboards, a three-fold operation is recognized and performed. There is, first, the "demand" or "call" made upon the postoffice operator by the National Telephone Company's operator in the city, or by the postoffice operator in the distant town. Then there is the maturing or duration of call and reply; the time which the correspondents occupy in speaking with each other, and, as a third stage, the cessation of call in which the trunk and the local connections of the National Telephone Company are cleared and brought again to normal.

The first operation is performed by the use of what are termed ticket wires or record circuits. By means of these wires or circuits the call is announced in the operating room. Operators are set apart for the particular duty of attending to these circuits, watching it might be said, for trunk calls either from the exchange of the National company or by a trunk wire, from the postoffice operator in another town. On a trunk call being received, the call is immediately coded, that is, timed, the time being marked with the letters of the time-code system in use, on tickets printed and provided for the purpose. The number of the subscriber required is also noted on the ticket. When the time of receipt has been coded and the number noted, the ticket is passed to the proper section switchboard that the trunk communication may be made. At each side of the switchboard a small rack is placed, the rack at one side containing tickets on which calls may be coded and that on the other side being for the reception of tickets when the call is completed.

The second or maturing stage commences by the section switchboard operator communicating with the postoffice operator in the distant town. The distant operator will communicate with his local branch of the National Telephone Company and through that branch the subscriber in the distant town will be placed in communication with the trunk wire. The operator in the town-of-origin, Manchester in the present case, will then be informed that the trunk communication is open, and, through the National Telephone Company's exchange, the subscriber in the Manchester area will be informed that he is in touch with the distant subscriber. The subscribers' communications will now be made, the time occupied by them being noted by the operator, and coded on the termination of the call.

The expiration of the time limit may be announced in two ways, known as the *A* and the *B* methods. By the *A* method the National company's subscriber rings and an aluminum shutter on the self-restoring indicator of the section switchboard is moved slightly from its normal position. By the *B* method, the originating operator on receiving the clearing signal from another source, begins the series of disconnections which are required to restore the normal, all of which disconnections are automatically recorded from point to point, by clearing signals, until the whole series of disconnections has been performed. By disconnecting the trunk in the first instance, the operator who originated the call would notify automatically to the operator at the distant end of the trunk, that the call had been completed. The act of clearing the trunk would also, automatically, notify the National Telephone Company's operator at each end of the clearing of the junctions. On the reception of this clearing intimation, the subscribers would be disconnected and the circuits would again be at normal.

Delays are noted with great precision, a specially printed delay sheet being used for the purpose. A delay or inter-

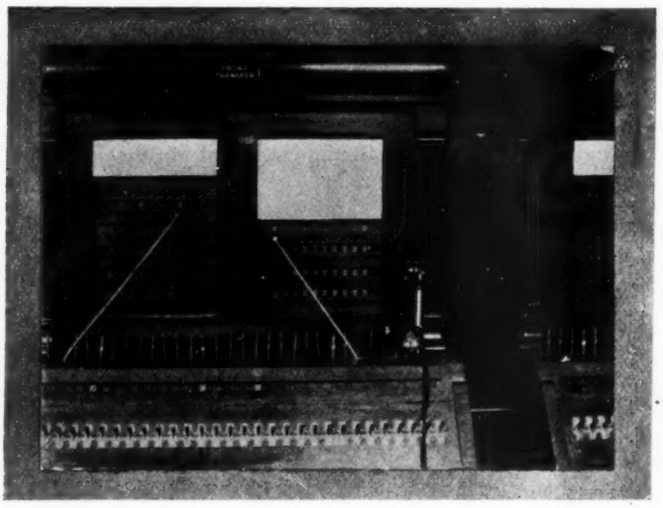

FIGURE 2.

ruption is immediately reported in the case of an interruption, steps are at once taken to restore the normal condition of the affected circuit.

To facilitate the working of local subscribers' trunk business, a local switchboard is used, Figure 1. This board possesses two, front panels, as compared with the single panel of the ordinary section switchboard. On the panel at the left-hand side there are more switch-plug holes and keys, and more of the circular indicators than on the ordinary section board. On the right hand panel there are fewer switch-holes and indicators but there is a circular switch and a tremble bell. On the table at the base of the panels there are also more plug connections. Manchester local subscribers' business is done by means of this local board. The business of other important towns in the district is done

through switchboards which are allocated to those towns, constituting the sections.

The local switchboard stands in the central part of the operating room, forming the front of a large cabinet-like structure. One side of this structure is formed of another switchboard known as the "Trunk Transfer Board," Figure 2. This board fulfills an important and invaluable function. By means of the circuits which can be formed at the board, communications can be established between section and section, the calls being transferred from one section to another. As business has demanded, however, sections have been regrouped and new sections have been formed.

The lady supervisors' desks are also stationed in the central part of the room. The desks are so provided with plug and key connections that the supervisors can ascertain exactly what is passing at the circuits. The whole of the operating staff is therefore under the immediate notice and control of the supervisors.

Each switchboard is provided with an Ericsson microtelephone, a combination of an Ericsson transmitter and a watch-case receiver. Electrical current for the ordinary speaking circuit work, is generated in the power-room of the postoffice where there is a well arranged collection of generating machinery, to supply the electricity used for the telegraphs. The power room is in the basement. Here, there are three units of modern plant, each consisting of a compound, inverted vertical Williams' steam engine, driving a directly connected dynamo of horse-shoe type, of J. H. Holmes & Co.'s "Castle" pattern, the output being at 108 volts. To produce magnetic current for ringing, a small Crocker-Wheeler dyna-motor is used, with an Ericsson generator. The main source of supply for the general work of the circuits is, however, obtained from accumulators which also supply current for the telegraphs. These are stationed on one of the upper floors of the building and consist of 141 cells of the Electrical Power Storage Company's "K. 7" pattern, arranged in three rows, two deep. A well equipped, double switchboard, serving for telegraph and telephone work, stands a few feet from the front end of the rows of cells. The conductors from the cells are carried down through wide but shallow cases formed of wood and pass below the switchboard and up at the back of the board to the recording instruments. The voltmeters are of the Weston type. Each part of the board has its own automatic cut-out for emergency use.

Steam for the engines is supplied by boilers of the Lancashire type, of which there are three, situated in the basement of the building, the working pressure being about 120 lbs. The whole of the machinery is kept in a high condition as regards efficiency and cleanliness.

The changes for the trunk service at Manchester vary, according to the distance of correspondents' towns, and are as follows. For a distance not exceeding twenty-five miles from Manchester, 3d (six cents) per call; between twenty-five and fifty miles, 6d (twelve cents) per call; between fifty and 75 miles, 9d (18 cents); between 75 and 100 miles, 1s (twenty-four cents), and for every additional forty miles, 6d (twelve cents). These charges relate to a three minutes' service by day and six minutes by night, the actual time, as explained above, being double the nominal time. The time, however, is carefully checked or coded and an excess of the period allowed is charged for as an additional period.

The technical and constructive supervision and the administrative control of the Manchester postoffice telephones are exercised by Mr. H. Haskayne, superintendent and engineer of the North West District and Mr. W. E. Halton, chief superintendent of the postoffice telegraphs and telephones, respectively. Extensive and important as the trunk service of Manchester is, the service is in a condition of steady growth. It is claimed that Manchester is now the largest telephone trunk centre in the world and the postoffice authorities are fully alive to the fact that ere long a material increase in the trunk and switch-room facilities will have to be provided to meet the still growing demand upon their establishment and lines.

## TROUBLES OVER THE TELEPHONE.

"Oh, dear me, telephones are a great invention, I know," sighed the busy housewife yesterday, "but they are not what you might call an unmixed blessing. If only the women who have nothing to do in the morning would remember that there are such things as household duties for some women. I have been called to the telephone three times this morning by some of my friends who just wanted to visit. Twice the bell woke the baby up and once my blackberry jam burned while I was trying to make an excuse to get away.

"We have a party line, and often when I am in a hurry to give an order to the grocer, there will be two women gossiping over the telephone, who will keep it for fifteen minutes at a time. And the love making is about as bad. Early this morning I tried to call up the butcher and each time there was a young man evidently trying to explain some sort of a misunderstanding which he had had the night before with a girl. I stood it for about ten minutes, and then I said:

"Don't you think that it would be lots easier if you would just put on your hat and go and explain about it in person? And then some one else might have a chance at the telephone.

"The young man laughed and cut off without a word. Yesterday morning one of my friends called me up just after breakfast. She boards and doesn't seem to realize that one may have work to do about that time. The baby began crying and I just held it up to the telephone and let her hear it. I found that is a good way to shut off a telephone visit. After this I am going to take the baby with me to the 'phone and let it cry when the visit becomes too long."—*Philadelphia North American.*

## TELEPHONES ON BARBER CHAIRS.

Telephones on barber chairs are the latest innovation in Paterson, N. J., and so popular is the plan that before long it is expected other barbers in the city will have telephones installed. The barber shop is the only one, it is believed, in the United States which can boast of having telephones on its chairs. Through them it is possible for a business man, while being shaved, to hold constant communication with his office.

The barber in charge says that he put in the telephones as an experiment, and he has been congratulated by several of his customers, who are unanimous in their opinion that, while the plan is a novel one, it is soon to become popular in other places.

## A HYDRAULIC LONG DISTANCE TELEPHONE.

Prof. Quirino Maiorana, an Italian scientist, has been engaged for some time in perfecting a hydraulic telephone, and has suceeded in transmitting speech distinctly from Rome to London. The successful results of this experiment have been confirmed recently, when the London General Postoffice was able to understand clearly whatever conversation was transmitted from Rome. The success of this experiment is the more remarkable as the telephone line, Rome-Paris-London, apart from its lengths, includes submarine cables in the channel, so that this achievement is claimed to be the most important telephone transmission ever obtained up to now.

# Telephony.

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## THE ATLANTIC MONTHLY, MR. COBURN AND TELEPHONE DEVELOPMENT.

THE Atlantic Monthly is a magazine published in Boston, and for nearly fifty years it has maintained a literary standard of much dignity and of high repute. For all of its long life it has been a foremost medium for the presentation of American literature. In its pages Dr. Oliver Wendell Holmes first introduced the Autocrat of the Breakfast Table to a welcoming public. In them, too, James T. Fields presented the output of such literary lights as Henry Wadsworth Longfellow, Harriet Beecher Stowe, James Russell Lowell, Ralph Waldo Emerson, John G. Whittier and Thomas Bailey Aldrich, not to mention other great ones within and without the group that made New England for a time the center of the western literary empire.

More than any other American magazine, through at least a very large part of its career, the Atlantic Monthly has been distinguished by a freedom from sensationalism. Indeed, in some degree, its circulation has been restricted because of its intentional abstention from an attempt toward popularity. The manifest attempt has been to elevate popular taste in literature rather than to adapt its pages to the average literary appetite. In short, there has existed no tendency toward the startling, and only the paper cover has been yellow.

Now comes a Mr. Coburn, in the November issue, in an article entitled, "Telephone Development in the United States." A reading of his contribution arouses a multitude of emotions, among them being one that his effort is notable. It is this because in an attempt to prove that the telephone development in the United States is large to-day and is destined to be much larger, he gives figures which, while they are startling, are not correct. It is a keen disappointment that this is so, because all of his statistics are given with an air of authority, and, where they refer to the number of telephones used by the Bell company, are carried out with apparent accuracy to units' place. The article is further notable in the existence of misleading statements other than in figures and in the deductions which are drawn. These deductions share with many of the figures the distinction of being incorrect, although a conviction as to wrongness in this regard is not a mere matter of comparing Mr. Coburn with a better authority.

A most interesting document could be offered by clipping Mr. Coburn's article and pasting it up in the form of the deadly parallel with items of information selected from any of the reliable sources. With the hope of presenting some of his thoughts in a sufficiently similar way, we take the liberty of quoting from that portion of his screed which deals with the relations between the Bell company and the Independent ones.

"Another great problem grows out of the existence of competing companies. As a prime condition for proper expansion of the utility there should be a single efficient management of the telephone lines of the country. Competition makes only for anarchy and inferior service. The maximum of usefulness can be attained only under a comprehensive system.

"This point deserves all possible emphasis. There is neither economic nor technical excuse for telephone competition in any American community. The 'Independent' movement could never have come into being but for the unfortunate persistence in this country of a crude notion that any kind of competition in any kind of industry is good. Of course, in reality what may be the life of one trade easily works destruction in another. The truth is that some forms of competition are beneficial, others extremely unhealthful and undesirable. Competitive activity in telephony has been proved by experience as well as by logic to belong to the undesirable type."

The central thought that the telephone business is a natural monopoly is not new, and Mr. Coburn's re-expression of the belief has a phonographic exactness which is quite familiar. During the years in which the existence of the Bell patents safeguarded that monopoly there were

many persons not in the business who shared the belief that a single efficient management of the telephone lines of the country would have assisted the proper expansion of the utility, yet in all that time the instances wherein the management seemed efficient and wherein a proper expansion was made possible by the character of the service and the size of the rates were very few indeed. The Independent movement came into being because there was not only an excuse for its existence, but a demand as well. Competitive activity in telephony has given to the American people a result of enormous benefit to themselves and in two absolutely certain ways. One of them is in the fact that they have provided themselves with a far more nearly adequate extent of telephone service, and the other in the stimulus which has been given to the activity of the Bell company everywhere.

"The growth of the so-called 'Independent' companies has from the outset been accompanied by abuses vastly worse than any that its promoters have claimed to eradicate."

The abuses in question certainly must have been suffered by investors in Independent companies. Only persons disappointed in this regard or those who are financially interested in the Bell company are in a position to complain. The testimony of the public is everywhere favorable, for the very natural reason that it has secured the benefits which always follow an industrial awakening in connection with any public service.

"An enlightened public policy would have prevented their ever coming into existence, while allowing the Bell companies everywhere to maintain their monopoly, and holding them strictly to account for producing satisfactory results."

There are only two ways in which the public would seem to be able to hold a Bell company to account, these being the pressure of public opinion in free speaking and free writing, and the enactment of laws in regulation of the companies' operations. So far as the history of their effort shows us anything during the days of the complete Bell monopoly, both methods have failed. No one needs a reminder of the unpleasantness of attempting to secure a better or wider telephone service in those days, and no one ever has shown that either the community or the company has benefited from any legislative attempt, whether municipal, state or national.

"That the Independent telephone companies have no proper reason for existence has been made abundantly clear by the frequency—one might almost say the regularity—with which they go into bankruptcy."

This paragraph tends toward amusement because of the fact that the most notable instance of telephone bankruptcy was that of one of the Bell companies, concerning which our author speaks so eloquently.

"The quotations of the securities of the principal Independent companies, as listed in the stock markets of Cleveland, Toledo, and other cities, reveal accurately the status of even the strongest of the Independent telephone properties."

The quotations of the securities of Independent companies, so far as they are listed at all, cover about the same range and display about the same peculiarities as industrial securities in other lines. One thing which marks them is the striking difference in favor of the telephone securities in a comparison of their record with the early record of transportation and similar activities.

"Their plants have been built without common standards of construction and equipment, and, consequently, cannot usually be made to work in harmony."

All Independent telephonists are familiar with the sublicense privileges so widely offered by the Bell company. In its inception this scheme proposed to re-equip Independent substations with Bell transmitters and receivers on a rental basis, and thereafter to make the local system tributary to the Bell long-distance network. If so equipped any Independent exchange would be placed upon the same basis as any completely Bell exchange so far as inter-communication was concerned, and, so far as evidence to the contrary has been submitted, the operation of these exchanges has been found completely satisfactory. In the application of this exceedingly simple proposition Independent managers were found who balked at the expense of removing their own telephone equipment and substituting another on which a rental must be paid. To these managers an alternative proposition was offered which has enabled them to secure the benefits of inter-communication and Bell affiliation without the expense of any modification in their existing equipment and with no other change than to cut off the Independent toll lines and cut on the Bell. The inference, then, is that plants which have Bell affiliations are satisfactory in construction and equipment, while those not so blessed are quite the contrary.

"Theoretically it should be possible for a number of Independent companies between, say, Pittsburg and St. Louis, to hitch up and thereby create long-distance services; practically, such a result could be accomplished only through complete rehabilitation, at tremendous expense, of many of the plants involved."

Up to the semicolon this appears to be true. Thereafter one wonders why a complete rehabilitation also is not necessary in the case of the Bell plants which are unfortunate enough in physical condition to have a poorer outfit than the average Independent exchange.

It is interesting to compare the mental attitude of Mr. Coburn with those of Miss Tarbell and Mr. Lawson. The lady seems to be attacking individuals, corporations and principles as a result of a rather clear belief that wrongs have been done and still are going on. Mr. Lawson seems to be trying to do something which no one but he fully understands. Mr. Coburn leaves us neither in the glow of sympathy produced by Miss Tarbell nor in the confused condition produced by Mr. Lawson. This is so because his style and his statistics, to say nothing of his conclusions, show clearly what it is he is trying to do.

It is with interest and amusement that one notices two other articles in the same issue of the Atlantic Monthly. One is by Henry Holt and is a charming story under the caption "The Commercialization of Literature." Under ordinary circumstances one would have recommended the Atlantic Monthly as the best possible medium for such a writing, in the belief that never, in its half century of life had any imputation of commercialization been possible in its direction. The other article is by Samuel McChord Crothers and is entitled "How to Know the Fallacies." It is instructive and amusing at once, a combination not too common, but it is not essential that it be closely studied before reading Mr. Coburn's article, as his fallacies may be recognized at sight, even by one who has not taken special instruction in the art of knowing them.

## MOST TELEPHONES PER CAPITA.

LOS ANGELES, California, has more telephones in proportion to its population than any other city in the world. Somebody has been claiming that distinction for Stockholm, Sweden, but actual figures show that the American city has twice the percentage of development. Telephony is an American invention and has been developed in this country at least ten years ahead of anything to be found abroad, as foreign observers generally recognize. So the statement that has been circulated about Stockholm was absurd to start with.

In the Swedish capital there are about 42,000 telephones to an estimated population of 313,000, which is one telephone to every 7.4 persons. In Los Angeles, with an estimated population of 126,000, there are something like 35,000 telephones, or one to every 3.7 persons. Besides Los Angeles at least half a dozen other towns in the far west exceed Stockholm in telephone development.

It is a striking fact that the use of this modern convenience, which has become almost indispensable in the daily

lives of twentieth century Americans, has spread even faster in the newer communities than in the older ones. No doubt this is due in considerable measure to the differences in the character of population in eastern and western cities, the former having naturally a larger foreign element, while in the latter there is a larger proportion of well-to-do people.

The cities with the largest percentage of telephones to citizens almost invariably show the largest percentage of residence telephones too. Of the ten places that head the list in the number of instruments they employ six are also among the ten places with the greatest proportion of residence service. Besides, only three are in the list of cities and towns that have the greatest number of party line stations, showing that the fullest efficiency of telephone service is what is sought.

## THE TELEPHONE BUSINESS IDEAL.

THE telephone business is one of the most desirable for a great many reasons. There is a demand for telephone service beyond the ability to supply it. It can be furnished at a low cost. It can bring attractive returns to its owners. Its patrons are the best class of people in their respective localities. The outlook for the future is always bright for the reason the list of subscribers is always growing. The business, fortunately, is not susceptible to the ordinary vicissitudes. There is a growing list of subscribers whose bills are payable monthly or quarterly, generally, cash in advance. No long notes are taken. The bills are promptly paid. They do not consist of large single items. While the bills aggregate a large amount, they are distributed among the most reliable people of the community and in small single items. It is an ideal business. Its subscribers are practically cash, and its resources are not tied up in accounts. Its net income is in the banks ready for distribution among its stockholders. Is there any other line that combines so many elements making for success as the Independent telephone business.

## USE AND CARE OF TELEPHONE POLES.

THE installation of telegraph and telephone lines has been instrumental in increasing the demand for poles to such an extent that it might almost be said to have originated it, says the American Lumberman. Simultaneously with this increased demand for poles of all kinds came the exploitation of the white cedar swamps of the north, which at present furnish material to fill the pole requirements of a large part of the country. In addition to the poles used by telegraph and telephone companies are those employed by the urban and interurban electric lines. This use has greatly enlarged the demand in recent years and has been instrumental in increasing the use of shorter and smaller poles than at first were employed. From the three sources named arise demands for poles which are taxing the resources of the country to supply.

Early operators in the northern woods considered the white cedar swamp as so much waste territory, and little if any attention was given to it during the pioneer days. It is only within the last decade that the cedar pole and post business has been developed on a large scale, for only within that time have telephone poles come into general use, permitting of the employment of timber of various sizes, the small as well as the large pole—sizes which telegraph companies formerly did not employ to any great extent.

While white cedar has been the main reliance of telegraph and telephone companies and electric lines during the last few years it will not be long before other sources of supply will have to be developed. Cedar poles of Idaho are being offered in competition with the white cedar of the north and are coming into use to a considerable extent, although it is claimed by some that the poles are not so strong as are those of white cedar. Butts are not so thick and the poles as a rule have less wane and will not bear as heavy a burden as will the white cedar product of the north. This is the claim made and it is supported by the methods in vogue at the present time. The life of a pole is contingent upon its strength at the grade line—the point where it enters the ground. Above this point the pole remains sound and practically unaffected for many years and below it in the ground the heart will last almost indefinitely.

Increased cost of pole stock and the necessity of adopting some measure to prevent decay at the point stated has turned the attention of users to the desirability of treating the wood in some manner so as to secure this desired end. At the request of the big telephone companies the bureau of forestry has been conducting a series of experiments looking toward the promulgation of the life of telegraph and telephone poles. The object is to preserve and strengthen the pole at the main point of attack—the section extending six to eight inches below and above the surface of the ground. Decay sets in at this point and the wood destroying fungi reach up and down the pole and its strength lessens with comparative rapidity.

From experiments already made the bureau has shown conclusively that poles can be subjected to a preservative treatment which insures much longer service. The treatment used consists of injecting into the wood an antiseptic, preventing growth of the fungi which destroy the strength of the pole at the point where it enters the ground. In some cases it is customary to use a pole twelve inches in diameter at the base in order that the expected decay shall not weaken the pole to such an extent that it would be unable to support the burden of wires and cross-arms. It is set forth that in a certain number of years—the exact number not being given—decay will reduce a twelve-inch to an eight-inch pole and that the remaining eight inches is weakened by decay of the fiber, thus causing the pole to fall. It is claimed that if an eight-inch pole properly treated were used in the first place a great saving in cost would be insured and the life of the pole would be equal to that of the size used at present. The four inches saved in the size would represent a big difference in the cost of the stock and the age of the trees which must be used in supplying the demand. This investigation is timely and merits the hearty approval and appreciation of those most closely concerned.

## VALUE OF THE TELEPHONE.

IN illustration of extreme appreciation of the value of the telephone has been found in the case of an Indiana farmer who was on the line of a co-operative company in which it was necessary for each subscriber to buy his own telephone. He wished to have a telephone, and, after some consultation with his wife, they concluded to sell the kitchen stove and cook in the old-fashioned fireplace. Yet many farmers who have become accustomed to its conveniences would about as soon part with the family clock as to give up the telephone.

Farmers who have hauled their hay to town and "stood around" waiting for a buyer now sell it in advance by telephone. The farmer knows what products to load by having ascertained the demand and the price. In sickness or sudden injury, it is not necessary to gallop for a doctor. The doctor, by telephone, can prescribe some household remedy to be used until he comes. This may save life when time is precious. The doctor who has the telephone gets the call.

The telephone has proven a good thing to call for police, and often helps in burglaries, fires and accidents. It is speedier than a run to a fire alarm box. By it invalids are aroused from melancholy by the cheering talk of friends,

listening to music, sermons, etc. It is being used to cure the deaf. In contagious diseases it is invaluable. One woman reports she uses music over the telephone to amuse the baby. Another asked "central" to inform her at the grocery when baby cried.

The rides of orderlies over fields of battle were discarded by the Japanese. The generals gave their orders by telephone. If the business has any merit, the telephone will attract many times its cost in custom. With newspapers it is indispensable, and not only "local" but long-distance" is used many times more frequently than a few years ago.

## LOOKING BACKWARD.

IT IS not the policy of this publication to issue elaborate prospectuses of what is to be published in future issues, nor describe in its editorial pages, at great length, the many improvements and new features to be inaugurated. At the closing of each year we "stand pat" on our past record, and aside from the assurance we will improve and strengthen TELEPHONY in every way possible, have refrained from specific promises which we might not be able to keep.

It is with considerable pride that we call attention to the fact that this issue closes our tenth volume. From the first issue of TELEPHONY, which contained but forty-eight pages, to the present time, the publication has been going steadily forward, getting stronger with each succeeding issue and volume, until to-day it is recognized as the great national authority in its field.

During the past year TELEPHONY contained nearly one thousand pages of reading matter, illustrating and describing the progress of Independent telephony for the year. The greatest writers in the telephone field have been contributors to its pages, and aside from the complete record of progress of the industry, the most prominent engineers have prepared for us the best technical matter of the decade.

All the work of producing a publication like this, the money and time expended, the constant search for good material, is in the interests of our thousands of loyal subscribers, and we will appreciate their help and encouragement in producing a still better publication.

We shall be glad to have practical suggestions from our readers on the improvement of TELEPHONY for 1906. We will appreciate frank criticism and any ideas that will tend to make a better publication interesting, instructive and of the most value to the greatest number of readers.

We will appreciate criticism of our advertising pages, or suggestions that will tend to improve them. We believe we have as representative a list of advertisers in our field as has any trade publication in the world. More than fifty per cent of the companies represented in our advertising pages advertise exclusively in TELEPHONY, believing that this publication covers the telephone field thoroughly, and to advertise in any other medium would be unnecessary duplication. We do not know of any other class publication having fifty per cent of its advertisers, exclusive, and are told by publishers in other fields that this fact makes TELEPHONY remarkable as a class publication. Surely if fifty per cent of the leading manufacturing concerns advertise in this publication exclusively, it is prima facie evidence of its value as an advertising medium. This condition has no doubt helped us to get practically every buyer in the telephone field as a subscriber, for the reason that through no other source could they see the announcements of all the manufacturers and dealers of consequence. In the minds of telephone manufacturers and operators there has never been a question of TELEPHONY'S position in the field. In the first issue of the publication it contained the advertising of practically every manufacturer and dealer, as it does to-day. When the publication was four months old our circulation was over seven thousand copies a month. Since the first issue we have steadily increased our subscription and have always had the largest telephone circulation of any publication in the world. The work of our subscription department this year, augmented by the absorption of the subscription list of the *Telephone Magazine,* puts TELEPHONY in a class by itself, with practically no competition.

To our subscribers and advertisers who have loyally supported TELEPHONY and have helped us make it what it is to-day we are grateful and will aim at all times to merit a continuation of this loyalty and support.

We extend to every telephone man our best wishes for success and the season's compliments, with the hope that the new year will bring him full measure of all good things.

## A BREACH OF THE PEACE.

TO WHAT extent the use of the telephone may become an infraction of the peace is rendered an interesting contention by the case of Walter Clark, a Kansas City brass worker, who was fined $25 recently for persisting in proposals of marriage over the wire to a young woman by whom he had been rejected. Five or six times a day, and often at night, the complainant testified, she would be called up by her importunate suitor, pleading with her to reconsider her decision.

As everybody must know who has had the least experience with a telephone, it may, at any time, become a source of extreme annoyance in the household. Such incidents as having the "help" called up while the family is at dinner, the frequent and untimely use of the instrument by neighbors, the tiresome and useless conversations which it habitually imposes on subscribers, are not calculated, by any means, to add to the sweetness of existence or to contribute to the happiness of those who seek the blessing of peace.

If you have ever listened to flirtations over the telephone which are illuminated by the joy of mutual admiration, you cannot be a stranger to deadly fatigue. But when you contemplate the awful trial of listening repeatedly in the course of a day to the plaints of a love-lorn swain, you cannot question the wisdom or justice of the judge in classing that style of importunity as a breach of the peace.

## THE ASSOCIATION MAPS.

IT IS strongly urged that every Independent exchange manager in the United States send the National-Interstate Telephone Association, Cleveland, Ohio, a map of the toll and long-distance lines owned or controlled by his company. In the work of compiling maps the association has been handicapped by not receiving the complete information necessary to show all the Independent lines in the different states. If all telephone managers will promptly comply with this request it will greatly simplify the making of these maps, which are of great value and benefit to everyone interested in Independent work. It is to be hoped that every assistance will be given the association and that maps of every state can be published showing the wide ramification of the Independent movement. If the companies sending in their quarterly reports to TELEPHONY, on the report blanks which we have furnished, will include a map of their lines, we will promptly send same to the association at Cleveland.

The stockholers of the York, Pa., Telephone Company at a recent meeting voted unanimously to increase the capital stock of the corporation from $200,000 to $500,000 for the purpose of placing the wires of the company's system underground, making important rural extensions to the system, and adding general improvements. Charles H. Didlie, electrical engineer of St. Louis, Mo., has been engaged to prepare plans for a conduit system for the county.

# Railway Telephone Service*

FRANK F. FOWLE

THE ownership and operation of private telephone lines by railway companies is a proposition which differs essentially from the public exchange and toll business. There are three distinct differences which place the railway telephone service in a separate class, namely, the service is not operated for direct revenue, it is only an auxiliary in the railway business and the nature of the traffic permits discriminations and very quick service. Since the telephone is a competitor with the railway telegraph and the railway mail, the economy of the telephone is interwoven with the cost of the telegraph and the mail. It is generally true of the traffic of communication that the volume of traffic decreases with the length of haul and that the bulk of the traffic is short haul.

The whole question of telephone service and its economy is secondary to the traffic, and the use of the telephone is justified when the traffic can be handled as cheaply in no other way and when the nature of the existing wire plant is such that to neglect the possibilities of simultaneous use is a waste. The traffic of communication, by telegraph and mail, should be thoroughly studied before it is decided whether the cost of telephone line construction is justified. The very short haul traffic is almost invariably handled most economically by telephone; the rapid increase in the use of private branch exchanges bears out this view. The inherent advantages of the telephone in this field are quick service and immediate answer or response; and in the class of communications of which no record is made these advantages are paramount.

Undoubtedly the mail, the telegraph and the telephone are of relatively different economy under different conditions, but there is a class for each in which its economy makes it the superior method. It is important to keep records of the traffic of communication by these three methods, in order to see that each is handling the business which it is adapted to handle most cheaply.

The railway mail probably constitutes the cheapest means of communication and its peculiar field is not likely to be invaded until the advent of the printing telegraph. The natural tendency is to abandon the mail for the telegraph and the telephone, on account of the quicker service, and one of the uses of traffic records is to detect and prevent such abuses, when the speed of the mail service is amply efficient. However, the mail service can never be better than the train service, and this point seemingly constitutes its limitation.

The entire traffic of communication is generally divisible into three main parts—the local or short haul, the traffic over each division or the moderate haul, and the traffic between the division offices and the main offices or the long haul. The volume of the long haul traffic depends very largely on the organization of the various departments, the distribution of the organization over the road and the territory covered. The organization of the telegraph department will naturally be one conforming to the particular requirements of any case. There are two common features in nearly all organizations, namely, one train dispatching wire and one message wire, cut into all offices, over each division; if the division is long and the business heavy, it may be subdivided because one wire cannot handle the traffic. The long haul traffic between division headquarters and the principle offices is usually handled on wires cut into few offices, and not infrequently these wires are duplexed or quadruplexed. The cost of telegraph service rests on considerations which are quite apart from those which determine the cost of telephone service. Before discussing the question of cost it may be well to define it, as considered in this paper.

*Paper read at annual meeting of Railway Telegraph Superintendents at Chattanooga, Tenn.

### WHAT CONSTITUTES COST?

Cost may be divided into two parts, operating cost and cost of ownership. Operating cost includes labor, power, light, heat, rent and such supplies as are used in daily operation and not chargeable to plant maintenance. The cost of ownership includes the fixed charges on the entire plant, interest on first cost, depreciation, maintenance, insurance and taxes; it is customary to compute these charges on a yearly basis and give to their sum the term total annual charge.

The total yearly cost of ownership and operation is the sum of the total annual charge and the total annual operating cost. This cost covers the entire plant, both line and terminals. There is obviously a division of cost between line and terminals which results in the best economy; this division of cost may vary with the traffic conditions to be met, and the best economy will then be obtained by dividing the cost between line and terminals under conditions which satisfy the greater proportion of the traffic.

### COST OF LINE CONSTRUCTION.

All discussions of the comparative cost of construction are beset with the difficulty that the market prices of material and labor are constantly fluctuating. The average market price seems to be the only basis for comparisons which may be broadly useful; and that is the basis here used. The average price is further a safe basis in forming conclusions as to what proportion of future facilities should be included in the initial installation. As to this matter, it seems unwise to plan into the future further than the life of the vital portion of the plant for obvious reasons.

Following a study of the expected traffic comes the question of how much will the line cost for a given volume (or loudness) of transmission. This question, like most others, is one of increasing cost with increasing efficiency; or in other words—for a given length of line, the louder the transmission desired, the more will it cost. Much has been said about standards of transmission, but the choice of a standard is a matter to be determined by the interests constructing the line and paying for the service. The engineer is concerned with this question only to show the relation between the volume of transmission and the cost.

Standards of transmission are usually defined as those over uniform circuits of particular construction, with only a standard telephone at either end. It is then possible, knowing the equivalents of cables and apparatus in terms of the standard circuit, to design transmission circuits to meet almost any commercial condition. Standards are very frequently stated in terms of open wire circuits of No. 8 B. W. G., and of cable circuits of No. 19 B. & S. G. The open wire lines are strung with the wires twelve inches apart; increasing the separation improves the transmission very slightly. The cable circuits are insulated with paper; increasing the capacity diminishes the efficiency. The K. R. law of transmission in cables is a simple and useful one; if R is the metallic circuit or loop resistance per mile and K is the capacity between the two wires per mile, the talking efficiency is inversely proportional to the square root of the product K. R. For example, to double the capacity and

halve the resistance does not altar the efficiency. This law is inapplicable to open wire circuits.

High efficiency in open wire lines is secured by using low resistance wires; high efficiency in cable lines is secured by using low resistance wires and adopting a construction which will give the least capacity. The following table shows the weight of one wire per mile, for open wire circuits to talk various distances, on the assumption of several different standards.

COPPER WIRE.

| Distance in Miles. | Weight per mile, for a standard of No. 8 B. W. G. of 850 Miles. | 1200 Miles. | 1800 Miles. |
|---|---|---|---|
| 100 miles | | | |
| 200 miles | | | |
| 300 miles | 115 lbs. | | |
| 400 miles | 175 lbs. | 105 lbs. | |
| 500 miles | 230 lbs. | 150 lbs. | |
| 600 miles | 290 lbs. | 190 lbs. | 110 lbs. |
| 700 miles | 350 lbs. | 230 lbs. | 135 lbs. |
| 800 miles | 410 lbs. | 270 lbs. | 165 lbs. |
| 900 miles | 470 lbs. | 310 lbs. | 190 lbs. |
| 1000 miles | 530 lbs. | 350 lbs. | 215 lbs. |
| 1200 miles | 650 lbs. | 435 lbs. | 270 lbs. |
| 1400 miles | 780 lbs. | 520 lbs. | 325 lbs. |
| 1600 miles | 910 lbs. | 610 lbs. | 380 lbs. |
| 1800 miles | | 695 lbs. | 435 lbs. |
| 2000 miles | | 785 lbs. | 490 lbs. |

IRON WIRE, BB GRADE.

| | | | |
|---|---|---|---|
| 100 miles | 180 lbs. | | |
| 150 miles | 450 lbs. | 210 lbs. | |
| 200 miles | 750 lbs. | 400 lbs. | 160 lbs. |
| 250 miles | | 610 lbs. | 270 lbs. |
| 300 miles | | | 400 lbs. |

The cost of construction may be computed on the basis of fifteen cents per pound for copper and three and one-half cents for iron, and on the assumption that pin space is available on existing pole lines. There is also a charge against the circuit for its proportion of the original cost of right-of-way and the cost of poles, cross-arms, miscellaneous material and labor; but this charge is practically independent of the questions at issue and may be omitted from comparisons.

The cost of circuits in cable is determined by the prices of copper, lead and tin and by the method of construction adopted. The great advantage of the paper-insulated cable is the fact that its low capacity makes it very much less expensive than other types. Comparing rubber with paper on the basis that the rubber cable has about three times the capacity of the paper cable, the rubber cable will require more than three times as much copper as the paper cable, because the capacity increases with larger conductors; and rubber insulation is more expensive than paper. Paper insulation is undoubtedly the most economical for underground and permanent aerial work; rubber cable is justified only when its exposure is such that its superior insulating qualities are necessary and the extra cost may be regarded as insurance against service interruptions. Rubber insulation is superior for emergency cables and is often preferred for short submarine crossings. Paper cables are enclosed in lead sheaths to exclude all moisture and keep the paper perfectly dry. There is little advantage in sheathing rubber cables unless the thickness of rubber insulation is small and the cables are for submarine use. Aerial or underground rubber cables are usually covered with a layer of jute and then a braided covering.

Cables have been proposed with conductors insulated with rubber and then wrapped with paper; the advantages of this consist only in the advantages of rubber as an insulator, for the capacity will be practically that of conductors with insulation wholly of rubber. Cables have been proposed with the above arrangement reversed, the paper being applied first and then covered with rubber; such a cable will be more expensive than a paper cable, for a given efficiency. The capacity will be intermediate between that of a rubber cable and that of a paper cable. One of the advantages of a paper cable is that it may be laid up loosely, thus admitting air in the loose wrappings of paper and making the capacity even lower than a tightly laid up paper cable. It will be difficult to apply rubber insulation over the paper without compressing it and excluding the air.

Telephone cables are constructed in twisted pairs to avoid cross-talk; the length of twist varies from three to six inches. There is practically no additional cost over straight wire cables and they are equally efficient, with the advantage that conductors may be used as straight single wire circuits or as twisted metallic circuits.

The following table gives the mileage of No. 8 B. W. G. open wire circuit, which is equivalent to one mile of circuits of various gauges in paper cables of ordinary construction:

CABLE CONDUCTORS.

| Guage B. & S. | Mutual Capacity. | Miles of No. 8 B. W. G. which are equivalent to one mile of cable. |
|---|---|---|
| 22 | .069 mf. | 45.6 miles |
| 19 | .054 mf. | 28.5 miles |
| 16 | .065 mf. | 22.2 miles |
| 13 | .065 mf. | 15.7 miles |
| 10 | .090 mf. | 13.0 miles |

The cost of cables varies with a large number of conditions, but the following table shows the average cost of cables whose equivalents are given above—in dollars per foot:

| Number of pairs. | B. & S. Gauge. No. 22 | 19 | 16 | 13 | 10 |
|---|---|---|---|---|---|
| 5 | .037 | .059 | .073 | .115 | .148 |
| 10 | .054 | .083 | .109 | .175 | .239 |
| 15 | .061 | .10 | .139 | .231 | .331 |
| 20 | .072 | .12 | | | |
| 25 | .083 | .135 | .194 | .338 | .492 |
| 30 | .094 | .15 | | | |
| 40 | .109 | .179 | .273 | .483 | .734 |
| 50 | .128 | .21 | | | |

Thickness of sheath 1-12 inch.

The choice of the cable of the most economical efficiency in a given case depends on the standard of transmission, the length of open wire line, the length of cable and the number of circuits. In any given case there is a particular gauge of line wire, taken in conjunction with a particular gauge and capacity of cable, which will give the desired transmission at the least cost. The cost per circuit, for both open wire lines and cables, diminishes as the number of circuits increases.

This question of the selection of the most economical gauge of cable applies equally to bridle, office and switchboard cables; for example, the use of No. 22 B. & S. switchboard cable, in a line designed to talk 1,000 miles, is a very expensive proposition, because the same transmission could be secured with smaller line wire and larger cable, at less cost. As a general rule in cases where the burden of cost is in the open wire line, it is economy to use large gauge cables unless the cables are exceedingly short.

The terminal switchboard arrangements are also very important in their bearing on the efficiency of transmission. Petty savings on switchboard equipment are usually obtained at the sacrifice of efficiency, and it is very important to determine that the terminal talking circuits and apparatus are adapted to the line. A comparatively small investment in securing ample transmitter-battery power will improve transmission to the same extent that many times this investment, in increasing the size of the line wires, will improve it.

## SIMULTANEOUS USE OF CIRCUITS FOR TELEPHONY AND TELEGRAPHY.

There is very great economy in the simultaneous use of trunk lines for telephony and telegraphy. There are two systems in common use, the composite system and the simplex system; the former secures two telegraph circuits from one metallic telephone circuit and the latter only one telegraph circuit. The joint use is secured by introducing

certain apparatus at the terminals, the character of which is generally well known. The insertion of this apparatus impairs the line efficiency and point use is not economy beyond the point where the investment in increasing the size of the line wires, to offset the loss of efficincy at the terminals, exceeds the cost of an additional circuit.

One terminal set of standard composite apparatus impairs transmission to the same extent as the introduction of approximately 1.25 miles of No. 19 B. & S. gauge cable or 35.6 miles of No. 8 B. W. G. open line. The effect of two terminal sets would be equal to 71.2 miles of No. 8 B. W. G. Therefore, it is economy to composite only long trunk lines without intermediate telephone or telegraph stations.

In illustration of this, take the case of compositing a telephone line of No. 8 B. W. G. as compared with two No. 8 B. W. G. iron telegraph wires. The first cost of each circuit is given below, on the assumption that pin space is available on an existing line:

Cost of Metallic Circuit of No. 8 B. W. G. Copper.

| | |
|---|---|
| 870 lbs. Copper at $0.15 per lb | $130.50 |
| 80 pins at .01 each | .80 |
| 80 insulators at .02 each | 1.60 |
| 80 tie wires at .025 each | 2.00 |
| 10 sleeves at .035 each | .35 |
| Labor at $10.00 per mile | 10.00 |
| Total cost per mile | $145.25 |

Cost of Single Wire Circuit of No. 8 B. W. G. Iron.

| | |
|---|---|
| 378 lbs. iron at $0.35 per lb | $ 13.23 |
| 40 pins at .01 each | .40 |
| 40 insulators at .02 each | .80 |
| 40 tie wires at .005 each | .20 |
| Labor at $5.00 per mile | 5.00 |
| Total cost per mile | $ 19.63 |

The total annual charge on each circuit is computed below, on the basis of four per cent interest, fifty-year useful life of copper wire and fifteen-year of iron; the annual cost of maintenance being principally the cost of labor, it is taken as $1 per mile of wire.

Annual Cost of Metallic Circuit of No. 8 B. W. G. Copper.

| | |
|---|---|
| Interest at 4 per cent | $ 5.81 |
| Depreciation at 2 per cent | 2.91 |
| Maintenance at $1.00 per mile of wire | 2.00 |
| Taxes at 1 per cent | 1.45 |
| Total Annual Charge | $12.17 |

Annual Cost of Single Wire Circuit of No. 8 B. W. G. Iron.

| | |
|---|---|
| Interest at 4 per cent | $ .79 |
| Depreciation at 6.7 per cent | 1.32 |
| Maintenance at $1.00 per mile of wire | 1.00 |
| Taxes at 1 per cent | .20 |
| Total Annual Charge | $ 3.31 |

The annual charge on the telephone circuit must increase $6.62 on account of compositing the circuit, before it is economy to string two separate telegraph wires, and work the telephone circuit uncomposited. This resolves itself into a question of the distance between telegraph stations. An increase of $6.62 in the annual charge on the telephone circuit may be regarded as the interest, depreciation and taxes at 7 per cent on the additional copper—needed to maintain the efficiency of the telephone circuit. This amount capitalized is $94.57 and will pay for 630 pounds of additional copper—or a 750-pound wire instead of a 435-pound.

In designing a 1,200 mile line, on the 1,200 mile standard, it would be economy to introduce not more than six composited sections; giving telegraph service thereby, between the two terminals and five intermediate telegraph offices. The economy of the composite is less apparent with a better standard of transmission; but the economy on short-haul circuits, of less cost, is more apparent. The efficiency of the composite from a telephone standpoint exceeds the efficiency from a telegraph standpoint, for a telegraph circuit through twelve composite sets would not be satisfactory. The composite system is limited by the fact that an intermediate telephone station requires the same composite apparatus that is required at an intermediate telegraph station. Ringing over such circuits is accomplished by the use of special high-frequency ringers. The question of economy may be summed up in the statement that the composite system is best adapted to circuits of moderate or great length, on which the telephone traffic and the telegraph traffic are of a thorough nature, or direct business between terminals.

The simplex system is somewhat more flexible, but does not present the same economy of line as the composite. There are two types of simplex apparatus, one of which employs a repeating coil and the other a bridged impedance; the latter is the more efficient. The repeating coil method is employed when grounded ringing generators may be connected to the line, which otherwise would ground the telegraph circuit and chatter the relays; this method has advantages under certain conditions, but is not the most economical for long lines. The effect of a repeating coil of the most efficient type, introduced in the line at the terminal, is equivalent to the introduction of one mile of No. 19 B. & S. gauge cable, or 28.5 miles of No. 8 B. W. G. open line. The effect of the bridged simplex may be considered as equivalent to 0.25 mile of cable. Considering the former case of a 1,200 mile line of No. 8 B. W. G. copper, it will be economy to introduce simplex apparatus until the annual charge per mile of line exceeds $15.48; the increase of $3.31 capitalized at seven per cent is $48.14 and will permit increasing the weight of the wire to 595 lbs. per mile. A 595-pound wire will talk 1,570 miles and the margin over 1,200 miles is 370 miles of the 595-pound wire or 280 miles of 435-pound wire. It will be economy to simplex such a line provided the number of simplexed sections does not exceed twenty. Intermediate telephone stations bridged on the line require no simplex apparatus, and this feature adapts the simplex system to short lines handling way (telephone) business. An intermediate telegraph station, at which there is no telephone, may be equipped with a repeating coil if the station is not near either terminal, because the introduction of an efficient coil has less effect if the coil is in the center of the line.

The simplex system adapts itself to a greater range of traffic conditions than the composite, but it is especially adaptable to circuits handling way business, either telephone or telegraph. The Morse side of the composite system may be worked single or duplex and on the simplex system it may be worked single, duplex or quadruplex.

### CIRCUITS WHOLLY IN CABLE.

For distribution from private exchanges the use of cable is economical if a considerable number of circuits follow one route. On the basis that it is not advisable from a mechanical standpoint to string copper wire weighing less than 150 pounds per mile, it follows that No. 22 gauge cable becomes economy for more than ten circuits, No. 19 gauge for more than fifteen, and No. 16 for more than twenty. This conclusion is arrived at on the basis that a circuit of 150-pound copper costs per mile:

| | | | |
|---|---|---|---|
| 300 lbs. copper | at | $ .15 per lb | $45.00 |
| 80 pins | at | .01 each | .80 |
| 80 insulators | at | .02 each | 1.60 |
| 80 tie wires | at | .01 each | .80 |
| 10 sleeves | at | .025 each | .25 |
| Labor at $10.00 per mile | | | 10.00 |
| Total cost per mile | | | $58.45 |
| Total annual charge | | | 6.09 |

The cost of aerial cable per mile is computed as:

15 Pair No. 19 Gauge Cable.

| | |
|---|---|
| 5280 ft. cable at $ .10 per foot | $528.00 |
| 5280 ft. supporting strand at $ .01 per foot | 52.80 |
| 3000 cable hangers at $ .005 each | 15.00 |
| 40 suspension clamps at $ .05 each | 2.00 |
| 10 guy clamps at $ .10 each | 1.00 |
| Labor | 150.00 |
| Total cost per mile | $748.00 |

The annual charge is computed on the following basis:

| | |
|---|---|
| Interest at 4 per cent | $29.95 |
| Depreciation at 5 per cent | 37.44 |
| Maintenance at $15.00 per mile | 15.00 |
| Taxes at 1 per cent | 7.49 |
| Total annual charge | $89.88 |
| Total annual charge per mile of circuit | 5.99 |

Cables of No. 13 and No. 10 gauge are suitable only for use in connection with long haul circuits, but are the most economical for such work. It is good practice to employ cables having conductors of several gauges and such cables are in use, having No. 19, No. 16 and No. 13 gauge conductors.

If the cable had been compared with open metallic circuits of No. 10 B. W. G. iron wire, the point at which cable becomes economy would not have been reached for as low a number of pairs as in the case of the 150-pound copper circuit: the annual charge on the iron circuit of No. 10 B. W. G. is $5.54 per mile.

The use of loading coils for improving transmission, as shown to be possible by Dr. M. I. Pupin, is of great economy for long circuits in cable. There is usually no advantage in loading circuits less than five miles in length, and loading should be confined to trunk lines. There are few railroad conditions where loading would be of material benefit at present. The loading of open wire lines is not advisable except for circuits of small gauge—and relatively low efficiency for long haul work; considerable improvement may be obtained by loading such circuits. The improvement is obtained only for relatively long circuits and the gain is not so apparent when such circuits are operated in short sections, because of the harmful effect of bridges on the circuit at intermediate offices.

The loading of large gauge, open-wire lines is not advisable because such circuits are already very efficient and because whatever improvement may be obtained is dependent on high insulation of the line; and low insulation not only impairs the efficiency of the loading, but so impairs it under the conditions of very poor insulation that the loading is a detriment to transmission.

### LAYOUT AND DESIGN OF CIRCUITS.

The design of circuits to meet a particular set of conditions is a problem which may be solved with a precision equal to that in all ordinary engineering work, but it is essentially a traffic problem, in the broadest sense. The terminal conditions are of the utmost importance and have a great bearing on the line costs. In designing a long trunk line, the various conditions which affect the efficiency of transmission should be carefully considered. The choice of the proper gauge of line wire cannot be decided until the equivalent effects on transmission have been determined for all the circuits and apparatus in the longest connection. The equivalents should be known for the sub-station lines, the switchboards, the office cables, the bridle cables, the underground, aerial, and submarine cables and the composite or simplex apparatus.

The combination of circuits in open wire with those in cable, and combinations of both with composite and simplex apparatus are so numerous that they cannot be discussed here. The problem in general is that of selecting the combinations which make the total cost a minimum, for a chosen standard of transmission.

The normal direction of telephone development is the construction of inexpensive short-haul circuits initially, the moderate-haul and long-haul circuits following in order with the growth of the telephone system. The bulk of the traffic being short-haul, this represents an economical practice, since initial expenditures meet the greater part of the traffic. There are reasons for deviating from this, in the case of long trunk-line railroads having business of a nature that demands the best means of quick communication between important trunk-line centers or terminals; it is usually necessary, in such cases, to discriminate between users, in order to prevent burdening the line with moderate-haul business.

A 1,200 mile standard of transmission over No. 8 B. W. G. circuits is probably ample for most long-haul work. When the long-haul traffic is light and originates at a limited number of telephones, it is economy to boost the transmitter batteries and to employ two receivers, in order to save line copper. The use of two receivers, materially improve weak transmission.

It is important to keep way stations off long-haul circuits and in general not to load short-haul circuits with many stations. Permanently bridged stations are especially uneconomical if the traffic with them is heavy, and they are connected to circuits of any length.

### USE OF EXISTING WIRE FACILITIES.

The existing wire plants of railroad systems offer an opportunity for considerable simultaneous use. The cost of reconstruction of straight telegraph wires into transposed pairs would permit of a double use of the wire plant and it would be immediately available either for telephone or telegraph service. Further than this, an alternative means of communication is then available in case of failure of the telegraph service from any cause. It would also permit of dispensing with night operators in many instances, the small night traffic being handled by telephone. Iron wires are adequate for short-haul service and would relieve many of the existing telephone trunk lines of the burden of the short-haul traffic.

The cost of reconstruction will consist largely of the renewal of bad joints and the insertion of transpositions. The following estimate is based on the assumption that there are eight joints and two transpositions per mile of circuit:

| | |
|---|---|
| Renewal of 8 joints at $ .25 each | $2.00 |
| 2 Transpositions at .50 | 1.00 |
| Total cost per mile of circuit | $3.00 |

This would increase the annual charge on a pair of No. 8 B. W. G. iron wires from $6.62 to $6.94 per mile, the increase of 32c being 10.7 per cent interest on $3. Such a circuit would furnish transmission equal to the 1,200 mile standard, for 195 miles; for wires which have depreciated materially this might be reduced to 150 miles. Prior to transposing it, it will be necessary to measure the pole line carefully to determine the location of transpositions. Such work, done by three men at a rate of ten miles per day, should cost about $1.50 per mile of pole line.

### CIRCUIT EFFICIENCY IN HANDLING TRAFFIC.

The circuit efficiency—number of calls per day—increases with the number of circuits operated in a group to handle business over one route. The efficiency of a single circuit is usually low, but this has not been the experience in railroad work. Single trunk circuits are handling as many as 100 to 125 calls per day. As the volume of traffic over one circuit increases, the average delay on the traffic increases rapidly unless the circuit is one of a group of several circuits. Probably a traffic of fifty calls per day represents the largest traffic that can be handled without delay—giving first-class service. The use of the circuit to pass calls between the operator will occupy about ten per cent of the total time, leaving ninety per cent of the hour for actual circuit use.

It is important from a traffic standpoint not to bridge intermediate way offices on busy trunk lines. Party lines are not economical, except when the traffic per station is very small. If a station at some point on a through or trunk circuit has enough business to warrant telephone connection, it is usually the best plan to simplex or composite an iron circuit to the nearest office at which there is a private branch exchange. A busy station permanently connected

to a trunk circuit is uneconomical of the line, if the line is of any considerable length.

The operating and the traffic departments are usually large users of the telephone service, and properly so; the supply department may use the service to a considerable extent, also. The other users should be restricted in order to place the service at the disposal of those in a position to make the best use of it.

The daily message capacity of a telegraph circuit is about 250 messages—on a nine-hour basis. Railroad messages are of much greater average length than commercial messages and are not usually condensed to the same extent. The same is true of telegraph circuits that is true of telephone circuits, as regards the increasing delay with increasing traffic. For heavily loaded way circuits, under conditions where the way station attendant is a telegraph operator only incidentally, the telegraph probably handles the traffic as cheaply as it possible to handle it, if the traffic per station is small.

The relative efficiency of the telegraph and the telephone is a very broad question and one affected by many considerations. The following comparisons are based on a speed of conversation equal to four times the speed of Morse transmission. The average speed of conversation is 125 to 150 words per minute and the average speed of Morse sending is thirty to forty words per minute. The traffic capacity of one telephone circuit is equal to four straight Morse circuits, two duplexes or one quadruplex. The difference in labor costs is as follows:

| | |
|---|---|
| 8 Morse Operators at $65.00 per month | $520.00 |
| 2 Telephone Operators at $30.00 per month | 60.00 |
| Difference per month | $ 460.00 |
| Difference per year | $5,520.00 |

The lower terminal operating costs in the case of the telephone offset a considerable annual charge on the more expensive line circuit. On the basis of a 1,200 mile standard of transmission, the telephone is more economical than four straight Morse wires for distances up to 1,650 miles; it is more economical than two duplex Morse wires for distances up to 1,200 miles; and it is more economical than one quadruplex for distances up to 900 miles.

The economy of a simplexed telephone circuit, with the Morse side working quadruplex as compared with two quadruplex circuits, is such that it is the most economical arrangement for distances up to 1,200 miles, or a trifle less than this if there are many intermediate exchange switchboards.

The conclusion is that the economy in wire use consists in building moderate-haul telephone lines for simultaneous use, arranged to handle the long-haul business by telegraph. When there are special uses for long-haul telephone circuits, they are no more expensive than Morse circuits except for very long hauls above 1,200 miles. On railroad lines where the traffic of transportation is light or moderate, and where on train dispatching circuit and one combined business and commercial circuit are sufficient, the business can be handled most cheaply by telegraph. The very long haul traffic, also, can be handled by telegraph most cheaply. On railroad lines where there is heavy transportation traffic it is usually the case that the traffic of communication is correspondingly large; and this is the economic field of the telephone, worked simultaneously with the telegraph.

### RECORDS OF TRAFFIC AND WIRE TROUBLE.

Traffic records are of value—as applied to the mail, the telegraph and the telephone—in preventing abuses of the service and keeping the various classes of traffic in their respective channels, in detecting parts of the wire plant which may become idle through changes in organization or traffic methods, and in ascertaining when circuits are overloaded and additional facilities needed. Telephone traffic records should show date, time, origination, destination, reason for delay, length of connection or for what reason it was not established and the names of the parties or departments. Telegraph traffic records should show the date, time received, filed and transmitted, at the origination; at the destination should be shown the time received, filed and delivered. Mail records should show the date, origination, destination, train number and the departments between which the communication passed.

Traffic summaries should be prepared in two ways, one showing the daily message load on each office and the other the daily message load on each circuit. Records or wire troubles are useful to show causes for traffic delays and also to detect bad construction, bad line conditions or lack of prompt location and removal of trouble.

Line maintenance is an important question and it is economy to employ a force sufficient to clear trouble promptly. Trouble on trunk lines and long circuits should be cleared before local office troubles, if there is necessity for a choice. If a 100-mile circuit is in trouble, on which the total annual charge is $10,000 per mile or a daily charge for 100 miles of $2.74, it is obviously economy to get the section lineman to the trouble very promptly. This point is more strongly emphasized by the attendant delay to traffic and congestion of business.

### CROSSINGS WITH HIGH-TENSION POWER TRANSMISSION.

The growing commercial importance of transmitting power electrically, over transmission lines operated at pressures as high as 33,000 volts—and in the far west even higher—emphasizes the danger of such lines. The general question of the joint occupancy of pole lines and subways by telephone, telegraph and power systems is well set forth in the "National Electrical Code," of the National Board of Fire Underwriters. Class E, "Miscellaneous," Rule 64, on "Signaling Systems" and Class B, "Outside Work," Rule 12 on "Wires," and Rule 12A on "Constant Potential Pole Lines, Over 5,000 Volts," apply to all telephone and telegraph work. The telephone companies are making extensive application of various methods for protecting aerial crossings with high tension lines. Some of these methods have been described in the technical press (Electrical World and Engineer, May 21, 1904, by Robert E. Chetwood, Jr.) and are well worth using where the conditions permit them. Standardization of crossings is not feasible on account of the wide range of conditions to be met, but there should be a universal policy in regard to providing screens between the lines or going underground with one line, and also in regard to the minimum mechanical strength of wires, poles, crossarms, pins and insulators.

### EXISTING RAILROAD TELEPHONE SYSTEMS.

The following railroad systems have extensive telephone systems, including lines of considerable length: New York Central & Hudson River Railroad, Lake Shore & Michigan Southern Railway, Illinois Central Railroad, Lehigh Valley Railroad, New York, New Haven & Hartford Railroad, Delaware, Lackawanna & Western Railroad, Chicago, Burlington & Quincy Railroad, Pennsylvania Railroad, Pennsylvania Company, Chesapeake & Ohio Railway, Baltimore & Ohio Railroad, Northern Pacific Railroad, Pittsburg & Lake Erie Railroad, Long Island Railroad.

The largest gauge wire is No. 8 B. W. G. and the smallest is No. 10 B. & S. for aerial work. Considerable use of composite and simplex systems is made. The longest transmission is from New York to Chicago, 960 miles, over the New York Central & Hudson River Railroad and the Lake Shore & Michigan Southern Railway. The total mileage of telephone circuit is approximately 6,000 miles, excluding very short lines and station circuits.

# Map of Independent Telephone Lines in Ohio

The accompanying map of Ohio is only a preliminary edition showing about seventy-five per cent of the toll lines actually in existence. Considerable data for lines not shown has been received since tracing was made up, and the remainder is being gathered as rapidly as possible. A later edition of this map, which will be issued in the near future for general distribution, will show all of these Ohio lines.

Independent companies operating toll lines in Ohio who have not already sent The National-Inter-State Telephone Association a map of their lines are urged to do so immediately, in order that there may be no unnecessary delay in getting out an up-to-date edition.

# Manufacturers' Department

## THE CHICAGO ELECTRICAL EXPOSITION.

From the present outlook it is more than probable that the Electrical Show to be held in the Coliseum, Chicago, Jan. 15 to 27, will be the most complete and successful affair of the kind ever held in the world. There has been a rush for space and unless those who want to make exhibits get their applications in early it is more than probable that there will be some disappointments. Nearly one-half of the available 38,000 square feet has been assigned. The revised list of firms contracting for space is reported as follows:

American Electric Supply Co., American Steel & Wire Co., American Circular Loom Co., Automatic Electric Co., Allis-Chalmers Co., I. A. Bennett, Chicago Edison Co., Central Electric Co., Crocker-Wheeler Co., G. W. Conover, Crane Co., H. E. Cobb, Chicago Battery Co., Chicago Pneumatic Tool Co., Chicago Telephone Co., Electric Appliance Co., Electric Storage Battery Co., Electro-Dynamic Co., Federal Electric Co., Fort Wayne Electric Works, Fairbanks, Morse & Co., Sam J. Gorman & Co., Guarantee Electric Co., General Electric Co., Thos. G. Grier, Haller Machine Co., Krantz Mfg. Co., J. Lang Electric Co., Monarch Electric & Wire Co., Miller Anchor Co., Mark Mfg. Co., McFell Electric Co., Nungesser Electric Battery Co., Osburn Flexible Conduit Co., Overbagh & Ayers, Oliver Mfg. Co., Peru Electric Mfg. Co., H. T. Paiste Co., Roth Bros. & Co., Reynolds-Dull Flasher Co., J. L. Schureman Co., Swedish-American Telephone Co., Sprague Electric Co., Safety Armorite Conduit Co., Safety Insulated Wire & Cable Co., W. H. Schott, Simplex Electric Co., Stromberg-Carlson Co., G. I. Stanley Co., C. H. Thordarson, Telephony Publishing Co., Universal Electric Storage Battery Co., Vesta Accumulator Co., Western Electric Co., Wagner Electric Mfg. Co., Westinghouse Electric & Mfg. Co.

Of the many firms which have already contracted with Manager Mercein for space, there are four alone that could give an exposition big enough to attract general interest—the Chicago Edison, General Electric, Westinghouse and Allis-Chalmers companies. Then there are other firms which will exhibit startling developments in electricity. The New York show has but few of the large manufacturing companies. The success of the Chicago show along these lines, however, is largely due to the organization which is backing it, including Samuel Insull, president of the Chicago Edison Company, who is also president of the Electrical Trades Exposition Company, in which seventy-five of the leading electrical concerns of the country are stockholders.

The competition among the Art Institute students for the prizes offered for the three best posters suitable for a show of this kind has been particularly keen and has developed some striking results.

It is announced that several notable and interesting men will attend the exposition, including Thomas A. Edison, the wizard of Menlo Park, his son, De Forest, of wireless telegraph fame, and many others whose interest in the success of electricity has made them great figures in the technical world.

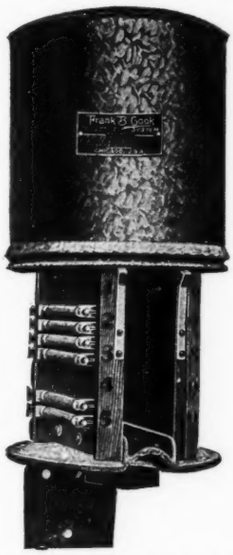
The electrical exposition will be made particularly interesting to the housewife. One firm is going to exhibit a complete electrical kitchen, including the stoves, the pots and pans and boilers and broilers, and the chafing-dish, with a guarantee of no dust—no smoke. There will be electric machines for house-cleaning, machinery for washing dishes,

roasting and grinding coffee, chopping meat, kneading dough, doing the laundry work, cleaning metal effects, polishing silver and jewelry, cooling the refrigerator, pressing clothes, rocking the baby, heating the bottle of milk, the curling iron and the heating pad for the sick room; in fact, there will be no end of interesting things in the show for everybody.

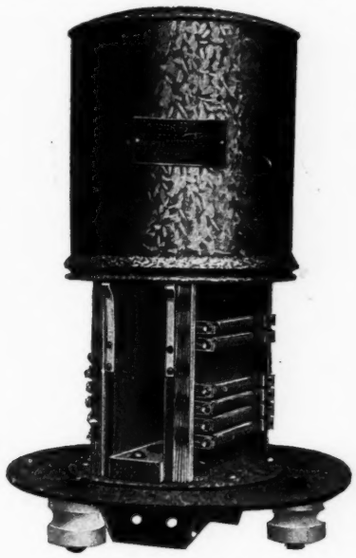
## NEW COOK SPECIALTIES.

Frank B. Cook is exploiting some new terminals, and, as usual, they have many points of originality to recommend them. Mr. Cook apparently strives not only to keep abreast of the times, but to anticipate them, and is continually working out new ideas to meet changing conditions. His latest is a terminal specially designed to meet the needs of exchanges who are modernizing their plants by using an "all cable" construction.

The type T-4 Cook terminal is particularly recommended for multiple tap work, and is designed specially with a view to economy and first cost. The terminal itself consists of the usual malleable iron bracket, on which are mounted two upright hard maple strips.

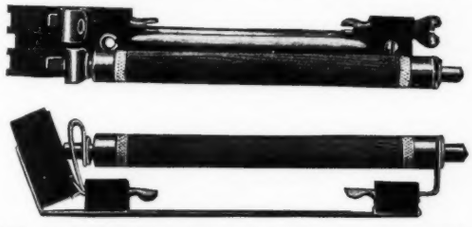


TYPE T-4 COOK TERMINAL.



TYPE T-6 COOK TERMINAL.

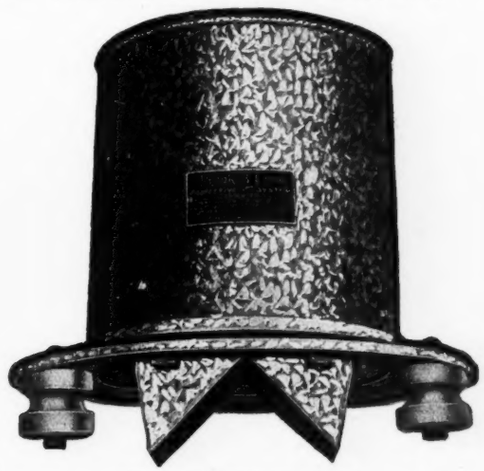
The protectors are arranged on individual mountings, so that one pair can be installed at a time. Any initial capacity can thus be secured, and the capacity of the terminal can be increased as desired, by simply adding the protector mounts. Two views are shown of the individual protector mounts, from which it will be seen that Cook has used the same simple spring device for clamping the fuses in place, that he used in his other terminals. This device holds the fuses



INDIVIDUAL PROTECTOR MOUNTS FOR USE ON TYPE T-4 AND T-6.

securely in place, and insures perfect contact. All the old style screws and nuts are done away with, and with this arrangement it is claimed that it is impossible for even a careless man to leave a loose connection. The protection consists of the regular Cook tubular fuse and carbon lightning arrester, separated by a celluloid dielectric. This celluloid dielectric is also a new idea of Mr. Cook's, which is meeting with great favor. Many of the largest companies in the country have entirely replaced their mica or silk dielectrics with these celluloids. Mr. Cook claims that the celluloids do not vary in thickness, and consequently are much more reliable in their operation. Celluloid is also susceptible of being worked to much better advantage, and while the ordinary mica separator has only three large holes, it is possible to perforate the celluloid with a great number of small holes. These serve to break up discharges and prevent chipping of the carbon. It has been found in actual practice that practically no dust passes at all, and consequently it is unnecessary to clean the carbons after a discharge.

The Type T-6 terminal is another new idea, in which the terminal is combined with a distributing ring. This terminal appears to be much neater and better, and is unquestionably much more economical than the old practice of using a terminal and distributing ring separately. As in the Type T-4 Cook terminal, the protectors are arranged on the individual mounts, so that one pair can be put on at a time, and the porcelain knobs can also be added one at a time, a galvanized bolt and nut being furnished for the purpose.



TYPE T-6 FRONT VIEW.

Both the Type T-4 and T-6 terminal are made for either solder or screw connections. Both types are equipped with a galvanized sheet metal cover, equipped with special springs which automatically lock the cover in place when it is raised, and hold it up. It is unnecessary to take off and hang up the cover of a Cook terminal.

On acount of the ease of access to all connections, no balcony is necessary with a Cook terminal. This is a still further reduction in cost.

The Type T-4 and T-6 terminals are made in any capacity, from 10 to 50 pairs, and Mr. Cook will be glad to give more detailed information and to quote prices on these, as well as the more familiar types of his terminals.

## HARD RUBBER SUBSTITUTES.

Many of the leading telephone manufacturers now employ a hard rubber substitute for their receiver shells, transmitter mouthpieces and other telephone parts. One of the largest and most successful producers of this article is the General Insulate and Machine Company of Brooklyn, New York, which was incorporated early in 1905 with an authorized capital of $50,000. Their Western sales agents are Messrs. A. J. Cox & Company, 1214 Chicago Stock Exchange Bldg., Chicago. This concern was organized by Joseph Steinberger, who is a pioneer in the manufacture of hard rubber substitutes. The company has a large and well equipped factory with the most modern machinery and will

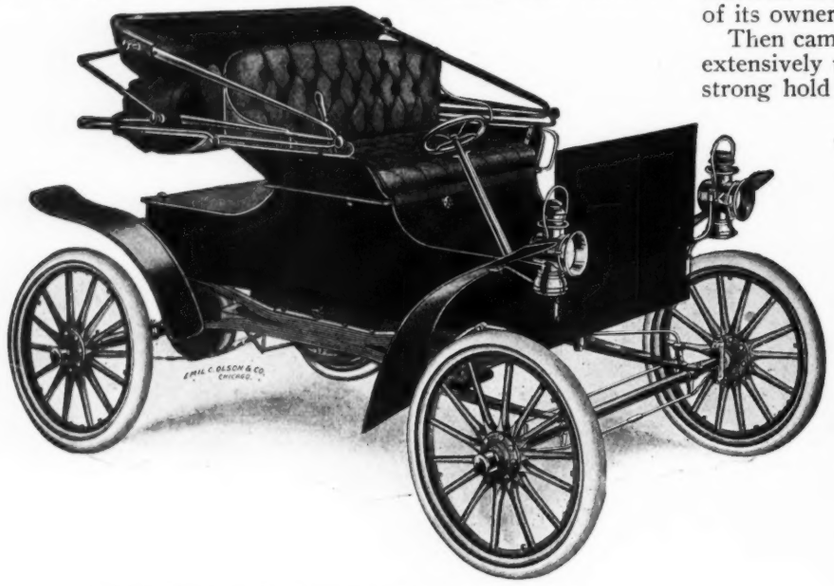
manufacture the very best substitute for hard rubber that can be produced.

It has a well-equipped machine shop and will make all of its own dies and moulds, as well as the metal parts and bushings which enter into the manufacture of some of these pieces. It is in a position to make prompt deliveries and give satisfactory prices.

Messrs. A. J. Cox & Company will be pleased to quote prices and submit samples of any of the company's material. They will make a specialty of manufacturing such pieces as seamless receiver shells, mouthpieces, crank handles, bases and terminal strips, and all insulating specialties entering into the manufacture of telephones.

## THE AUTOMOBILE IN TELEPHONE WORK.

The Monarch Automobile Company of Aurora, Illinois, is furnishing to many telephone men an automobile especially designed for them, and which is meeting with favor in all parts of the country. From the illustration it will be seen the car is handsome in appearance, and the manufacturers guarantee makes it a perfectly safe investment for any telephone manager. Orders should be sent in now for spring delivery. The attention of telephone men is called to the page advertisement in this issue of telephony.



MODEL FOR 1906 NOW READY FOR DELIVERY.

## WILLIAM W. HAWKINS.

Mr. William W. Hawkins, who is now associated with The Williams Telephone and Supply Company, of Cleveland, as engineer, has been connected with the telephone industry for eight years.

After graduating from the Columbia College School of Mines he entered the employ of the Western Electric Company, and after familiarizing himself with the work, his promotion was rapid until he was finally placed in charge of some of the large installations in New York City, Brooklyn, Paterson, Newark, Washington and Baltimore. After several years of this class of work, he was transferred to the Chicago house in the capacity of special engineer and inspector, where he made some radical changes in the factory and switchboard cabling departments.

About this time Mr. Hawkins was offered the position of assistant engineer, and was put in charge of the lead cabling and magnet wire plants as assistant superintendent with the Stromberg Carlson Telephone Manufacturing Company.

With the experience he has had in the employ of the two largest manufacturing plants, he will certainly be a valuable acquisition to the present strong organization of The Williams Telephone and Supply Company.

## FASHION IN TELEPHONES.

The telephone has become so thoroughly a utilitarian device and so essentially an everyday necessity in business as well as social life, that it would at first seem absurd to attribute to it any of the imaginative or real attributes that give value to a woman's spring bonnet or parasol. Nevertheless it is true that the elusive element of style or fashion has had a place even in the practical commercial fields of telephone manufacture.

A few years ago it was quite a thing among Independents to boast of the ownership of an ornate tandem cabinet magneto telephone, and the longer the battery box and the more material used in its construction the greater was the pride of its owner.

Then came the more practical wide battery box cabinet, so extensively used by the Bell company and which still has a strong hold upon the fancy of a goodly share of operators and subscribers. Later the compact style cabinet made its appearance, the original design for which is claimed by half a dozen manufacturers and is to-day by far more generally used in the Independent field than all other styles combined.

THE WESCO IDEAL TELEPHONE.

But in this day of improvement even this convenient, economical and practical style of telephone in the midst of its popularity finds a formidable rival in the "Ideal" cabinet which, because of its symmetrical design, compactness and accessibility to parts is forcing its way into the public mind.

This cabinet was originally designed and placed on the market by the Wesco Supply Company of St. Louis, several years ago, but it proved to be a "snow flower" born before its time "to blush unseen" by but a very small portion of the trade. Since that time, however, several manufacturers have recognized the commercial value of this cabinet design and have made efforts to introduce it to their trade with the result that a very general demand is springing up for this style of instrument, which at present bids fair to displace all others in the future.

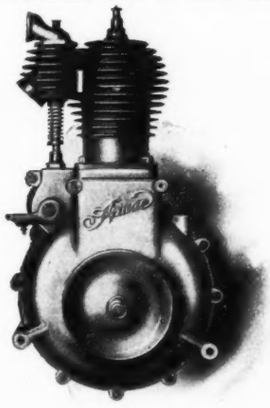
The accompanying illustration shows the "Ideal" magneto telephone as now placed on the market by the Wesco Supply Company. Among its advantages are the facts that the line terminals are inside of the cabinet entering from the rear of the backboard, thus placing these binding posts out of the reach of the user and avoiding the trouble so often experienced by patrons tampering with the line terminals.

In this instrument all the wiring is done from the rear

of the board and all the parts are firmly secured to the backboard, no shelves being used. Another point in its favor is that the transmitter arm is attached to the backboard which gives it a solid base and avoids the tendency to vibration experienced in the compact style of instruments, where the cabinet itself acts in the manner of a sounding board to the transmitter.

### THE 1906 ARMAC MOTOR CYCLE.

The Armac Motor Cycle, manufactured by the Armac Motor Company, 472 Carroll Ave., Chicago, is not a racing machine but is built for practical purposes and to fill the steadily increasing demand for a thoroughly reliable and powerful machine for every-day business purposes. The motor is full 3 h.p. and has ample power to carry two riders over any country road and with one rider and kit of repair tools up, will climb any grade met with on country roads.



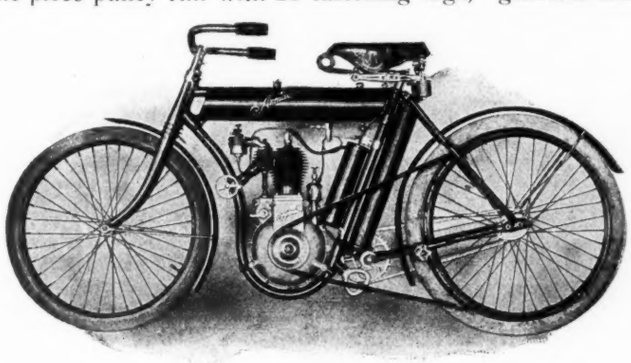
ARMAC MOTOR.

Motor is hung low in loop frame and with the weight of rider equally distributed between the wheels, gives a perfectly balanced machine. The long wheel base, 2¼" G. & J. motor cycle tires and the Person Royal Motor seat entirely eliminates the vibration of both motor and rough roads.

Extension fork sides are used with four crown plates, and the double post handle bars are absolute assurance against twisting of bars when in sand or on rough roads.

Machine is under absolute control of the right hand grip at all times; can be started, stopped and speed regulated from 4 to 40 miles per hour without removing hands from the bars.

Water-proof battery tube with automatic connections, one-piece pulley rim with 20 fastening lugs,—gasoline tank



THE 1906 ARMAC MOTOR CYCLE.

built in frame, one-piece cylinder and combination oiling device are among the features of improvement which are fully described in the company's sixteen-page, two-color catalogue, now ready.

The side car attachment for carrying extra passenger attached in 5 minutes, makes the Armac a thoroughly practical, inexpensive family automobile. Fuel capacity is for 100 miles and less than thirty cents per 100 miles covers cost of operating.

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THE INDIANA STEEL AND WIRE COMPANY, Muncie, Indiana, announces that its mills are running night and day to keep up with orders for telephone wire.

# The National-Interstate Telephone Association

General Headquarters - CLEVELAND, OHIO

November 21, 1905.

## OFFICIAL BULLETIN NUMBER FIVE

*MAPS:*

Maps of Indiana, Michigan, Missouri and Pennsylvania have been almost completed. We had hoped to finish one or more of these in time for publication this month, but the tardiness of a number of companies in furnishing data requested has made this impossible. We expect to finish these and a number of other State maps during the coming month. Complete map of Ohio will be ready for general distribution on or about Dec. 20th.

We must again urge Independent companies to be more prompt in responding to our request for map data. It will be impossible for us to compile maps of the various States without the co-operation of the Independent companies who operate toll lines.

*EXECUTIVE COUNCIL:*

Mr. C. E. Wilson, General Manager of the Keystone Telephone Company, Philadelphia, Pa., has been appointed a member of the Executive Council to succeed the late Mr. W. D. Barnard. A meeting of this Council, to be held in the office of the President at Cleveland, Ohio, has been called for November 24th. A list of committees appointed and a report of other matters considered at this meeting will be given in the next bulletin.

*COMMITTEE ON LITIGATION AND LEGISLATION:*

This Committee will hold a joint meeting with the Executive Council on November 24th.

*WARNING TO INDEPENDENT TELEPHONE COMPANIES:*

During the past six weeks the Association's attention has been called several times to circular letters which are being sent out in a number of the States by individuals and corporations representing themselves as promoters for Independent Telephone Companies or Combinations. All Independent companies receiving such letters are warned against giving out information regarding their plants without first satisfying themselves that it is not being furnished to irresponsible parties, and that it will not be used in any way to the detriment of the Independent telephone movement.

*AN INDEPENDENT SLOGAN:*

It has been suggested by a number of prominent telephone men that the Independent companies of the country, on all future directories, print the phrase, "Look for the shield," in quotation marks, as here shown, and also use this in their other advertising. This is already being done by a number of the companies in various States. The idea is to make this phrase distinctive in Independent advertising. The Association merely submits this for the consideration of its members.

## FILING CABINETS FOR TELEPHONE EXCHANGES.

On this page is illustrated one of many handsome filing cabinets, which are manufactured by the Railway Commercial Cabinet and File Co., Chicago. By means of adjustable partitions, any desired combination of drawers and filing compartments can be made up so as to precisely meet all of the various requirements of each individual customer.

The handsome combination illustrated herewith was assembled from the company's stock in just 30 minutes for the purpose of being photographed. It may also be stated in this connection that the Railway Commercial Cabinet and File Co. manufactures and carries in stock one of the largest as well as one of the handsomest, most convenient and most durable lines of cabinets, desks and cards to be

FILING CABINET FOR TELEPHONE EXCHANGES.

found in the United States. They are specialists in this kind of work and are prepared to figure on all requirements and fill all orders promptly.

Recognizing the large and growing demand for this class of supplies among the telephone exchanges of the country, the company is making special inducements to secure the telephone trade, and would like to hear from all companies now in the market or expect to be in the near future. An inquiry blank will be found attached to the firm's half-page advertisement on another page of this issue. Fill in your name and address and one of their latest catalogues will be promptly mailed you.

## A NEW TEST CONNECTOR.

The accompanying cut illustrates a new Test Connector recently brought out by the Fisk-Newhall Telephone Manufacturing Company, of Chicago, for which the following points of advantage are claimed over other connectors:

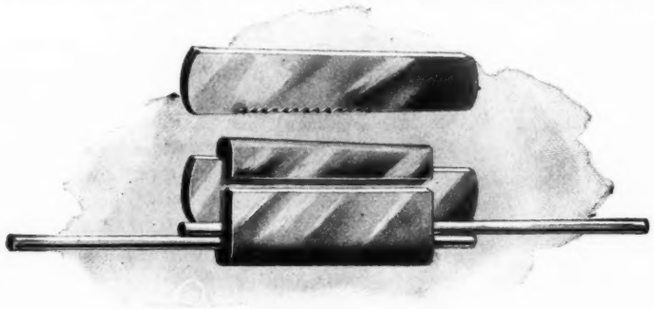
It is easily attached to either an open line, or to a continuous wire and a branch line, by driving the wedge into place.

It holds the wire perfectly, and is detached by simply hitting the small end of the wedge with any tool handy.

This connector may be used to advantage on all farmers' lines, and the advantage can be readily appreciated, when you consider the number of times you have to splice in a piece of wire, in connecting up subscribers cut off for nonpayment of rental.

With this device to cut a subscriber off, it is necessary only to drive out the wedge.

One will readily see from the construction of this con-



A NEW TEST CONNECTOR.

nector that the harder the wires pull the tighter becomes the connection.

These connectors are furnished either tinned or copper plated, as preferred. The simplicity of this device recommends it to the practical telephone man.

## A NEW STROUD SPECIALTY.

A very practical advertising specialty for telephone companies is being put out by Harold D. Stroud. The article is to be used wherever work is in progress, along trenches, dirt piles, at open manholes, etc. It consists of a piece of angle iron sharpened at the bottom and supports a standard Independent shield, on which the words Independent Telephone or the company's name may be placed. Just below the shield is a curled bar to support a danger lantern.

The novelty of this device as well as its neat appearance attracts attention and always favorable comment. The idea suggested itself to Mr. Stroud from seeing the crude arrangements used by the gas companies and he set about designing one for the use of telephone companies. A shipment of fifty of these devices has been made to the Quincy Home Telephone, Quincy, Ill., recently.

The spirit of Independent progress is put forward quite forcibly in this form of advertising, and such advertising, if persisted in by the Independents, will make the Shield and Independent telephony a unit, inseparable in the minds of the telephoning public. Since the shield has been adopted as the Independent emblem by the National-Interstate Telephone Association, devices of this kind which tend to advertise the shield should be used by all Independent companies.

M. B. Austin & Company, Chicago, report that their new universal cord joint, for use on switchboards, is meeting with the approval of cord users. A very large number of exchanges are taking advantage of their sample cord and joint offer as advertised. Descriptive matter will be furnished on application.

# The Williams-Abbott Electric Company.

THE Williams-Abbott Electric Company of Cleveland, Ohio, is one of the pioneer telephone manufacturing concerns in the Independent telephone field. From a small shop on a side street, the company has grown until it occupies one of the most modern and commodious factory buildings in Cleveland. In 1896, when the company was organized, it manufactured telephone generators exclusively, and for years supplied many of the telephone manufacturers with generators. As the business grew new apparatus was devised, and what started as an exclusive generator factory is now an up-to-date, modern manufactory, in which a complete line of telephone apparatus is produced. The company since it started was compelled to move several times in order to secure more space. The last move was into its own building, which is especially equipped for manufacturing telephone apparatus and supplies. The illustrations on the following pages will give the reader an idea of the building and its equipment. The latest automatic machinery has been installed, and owing to the company owning the ground on all sides, no other building is near it, which insures good ventilation and light, two important things in a factory.

MR. LOUIS SANDS.

The success of the company is due to its president and general manager, Mr. Louis Sands, who has devoted his entire time to building up the business. He entered the telephone field as a manufacturer to produce good apparatus and to a large extent the success of his company is attributed to this determination. Mr. Sands has surrounded himself with an able corps of assistants in each department of his factory, and with a carefully planned system, the work of manufacturing and shipping is reduced to an exact science.

Among the many new pieces of apparatus which the company has perfected and placed upon the market is the "Majestic" desk set telephone, which is meeting with such favor among telephone exchange managers that it is difficult to keep up with the orders. This instrument is made of the best material obtainable and is claimed to be the handsomest and most serviceable desk set obtainable.

The company has under way several new types of switchboards, which will be ready for the market within the next thirty days. These boards will embody some new and novel features, and from the drawings and models promise to meet the most exacting requirements in both exchange and toll line service, where practical and well-constructed apparatus is required.

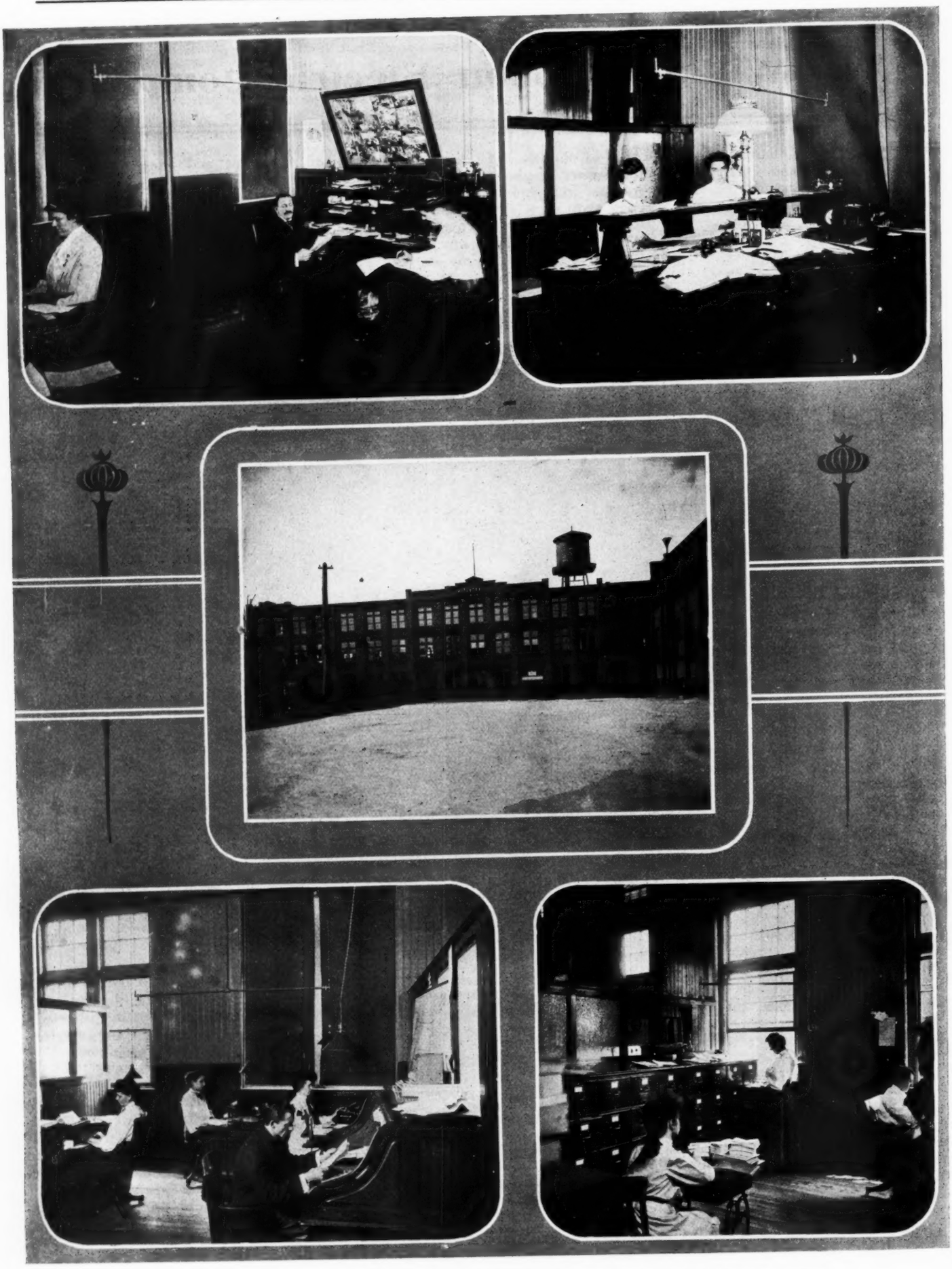
Another new piece of apparatus produced by the company is a combined telephone and telegraph instrument which has been adopted by some of the prominent railroads, telephone and telegraph companies. The company claims this device allows of more combinations for the use of telephone circuits in conjunction with telegraph circuits than any other similar apparatus now being offered for this class of work.

A new departure for the company has been the perfecting of a complete line of electric soldering irons for telephone and electrical workers. Among the features of this line of apparatus is the double winding feature which insures the proper heating with less consumption of current than any other similar apparatus on the market.

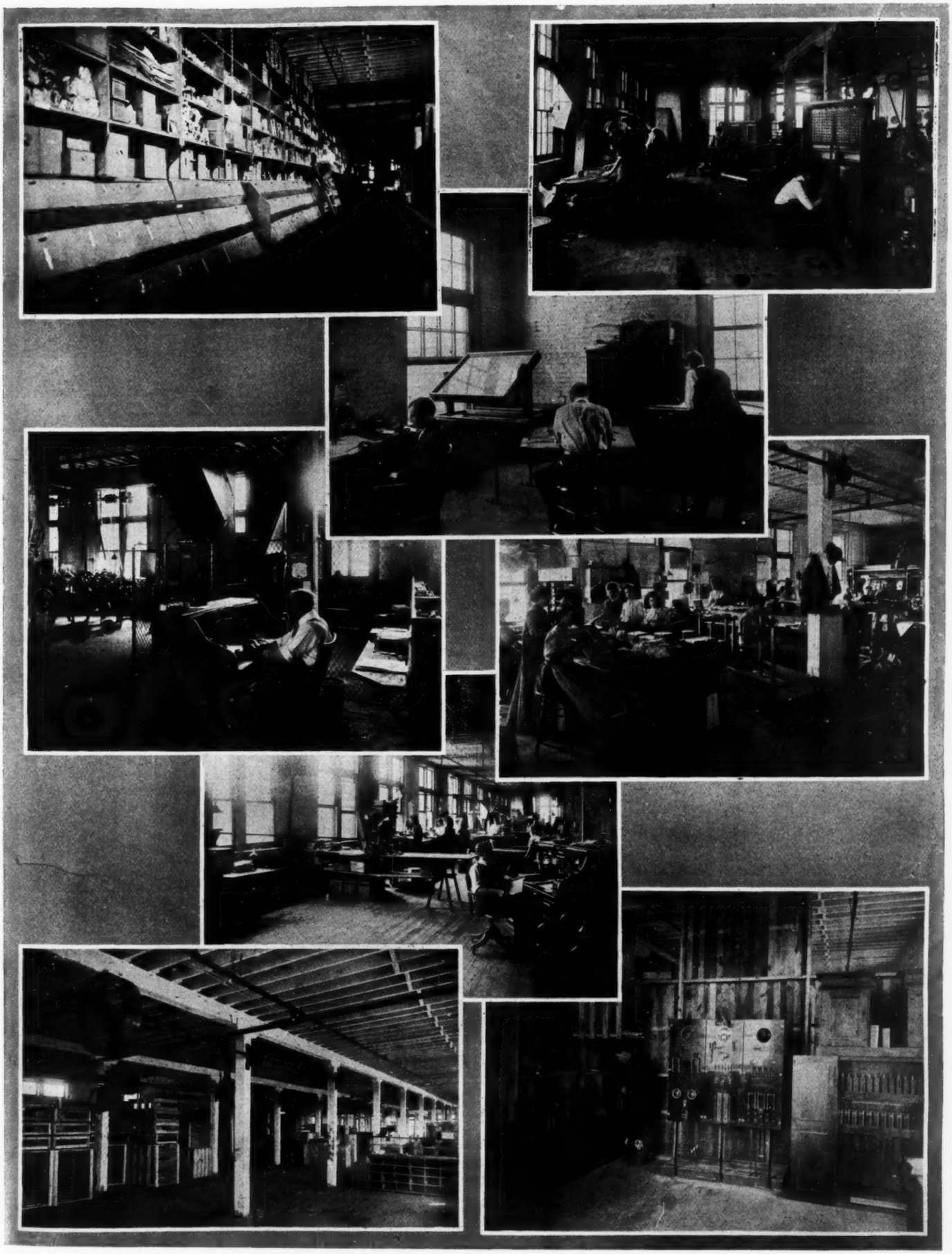
Aside from the new apparatus recently designed and offered to telephone buyers the company manufactures a complete line of telephone equipment composed of series and bridging telephones, common-battery telephone, generators, extension bells, party-line telephones, switchboards of all descriptions, and a great number of telephone and electrical specialties, beside special apparatus built to order, the company doing a great deal of work of this kind for smaller manufacturers and electrical and telephone dealers throughout the United States and Canada. Williams-Abbott apparatus is in use in every state in the Union, and is being sold in larger quantities each year. The company claims that discriminating buyers who have a knowledge of the electrical and mechanical perfection of apparatus, use Williams-Abbott make for the reason that the company is constantly striving to improve all of its product and sells it to the user under a broad guarantee, which protects the buyer and insures him against any loss.

Telephone men visiting Cleveland are invited to inspect the company's new factory, where every facility for their convenience and comfort has been provided. The management will be glad to show telephone men through the factory and explain in detail how every part is made, that enters in the completed Williams-Abbott apparatus. A visit to a telephone factory containing over 100,000 square feet of floor space and equipped with every modern contrivance for the handling of a large business, is in itself a liberal education, and the company will appreciate a call from anyone interested in the telephone industry.

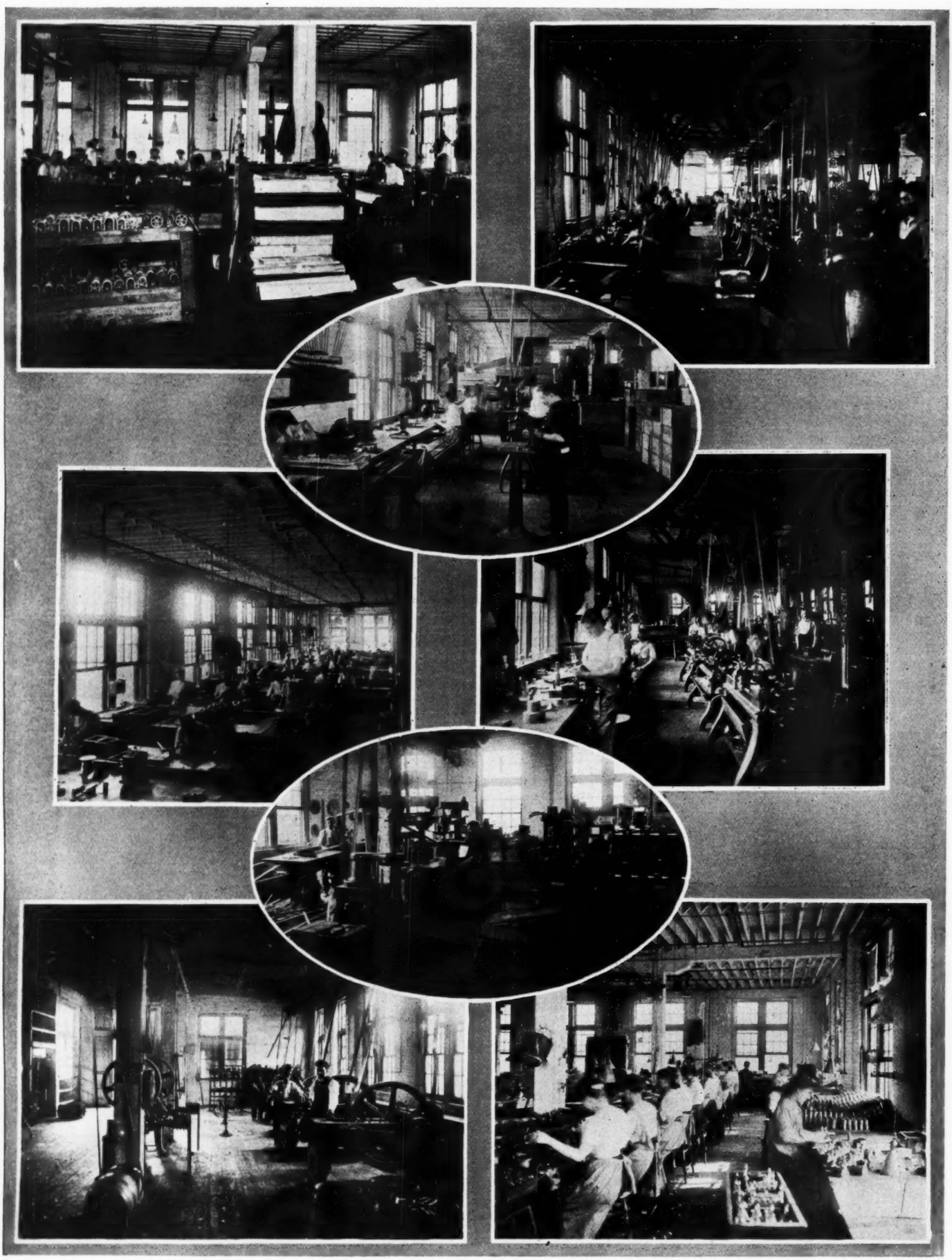
Prompt shipment of all orders has been made an absolute rule with the company. In most cases apparatus, unless of a special make is shipped on the same day the order is received. Correspondence is invited from telephone buyers, and courteous treatment is assured to all customers.



FACTORY AND GENERAL OFFICES WILLIAMS-ABBOTT ELECTRIC COMPANY, CLEVELAND, OHIO.



SOME VIEWS IN THE FACTORY OF THE WILLIAMS-ABBOTT ELECTRIC COMPANY, CLEVELAND, OHIO.



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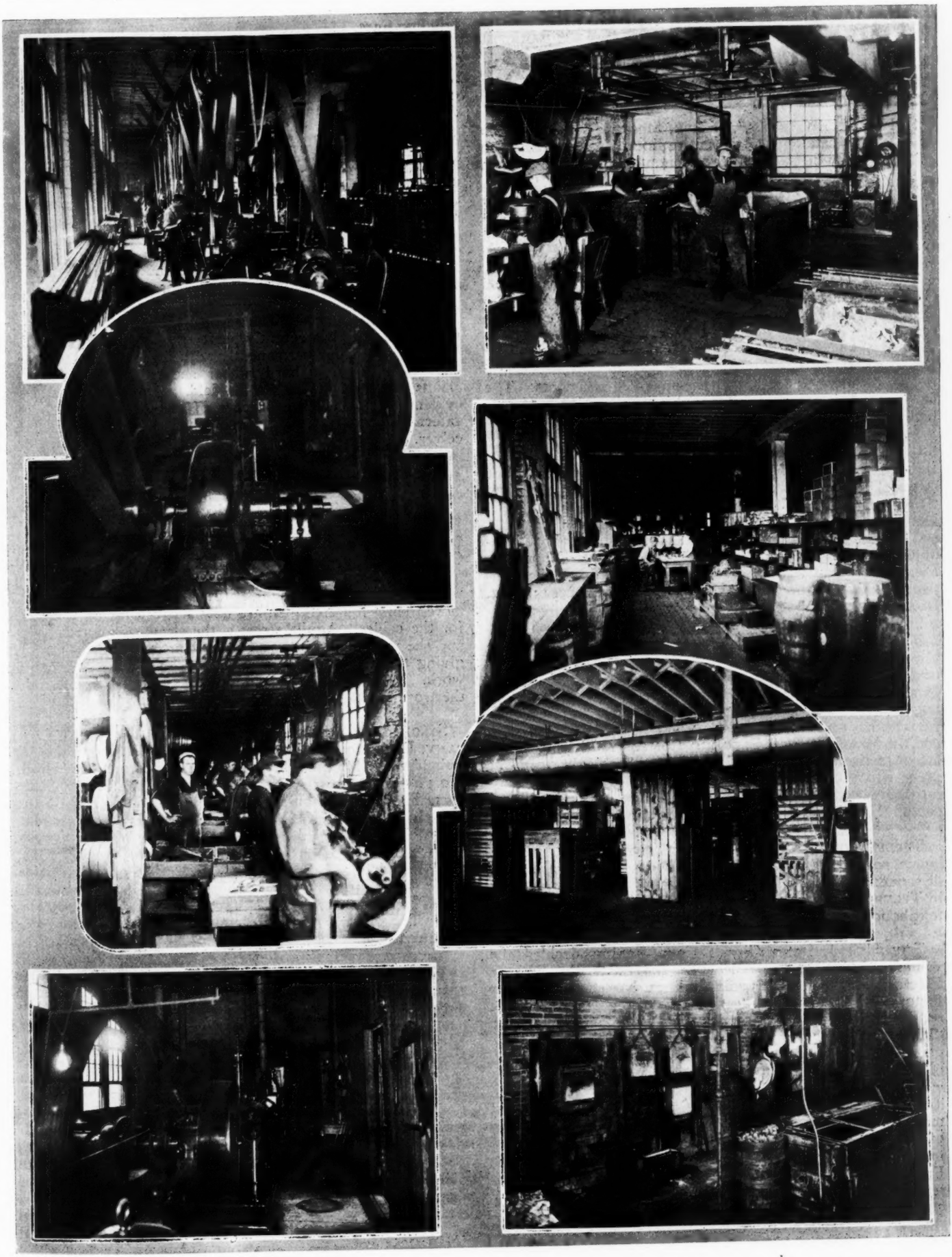


SOME VIEWS IN THE FACTORY OF THE WILLIAMS-ABBOTT ELECTRIC COMPANY, CLEVELAND, OHIO.

# Trade Notes

S. H. Couch Company, Boston, Mass., is sending to the trade a new catalogue of its entire line of apparatus. The catalogue may be had by any telephone man for the asking.

The Live Wire for October, published by The Live Wire Publishing Company of St. Louis is full of interesting matter to telephone and electrical men. It will be sent free upon request.

The Williams Telephone and Supply Company, of Cleveland, Ohio, has recently issued a booklet entitled "Hello Central," which will be sent free to any address upon request.

The Simplex Company, of Newark, N. J., has recently issued an advance catalogue of Simplex instruments. The book contains interesting data and is illustrated. It may be had for the asking.

The Chicago Telephone Supply Company of Elkhart, Indiana, has recently sent out an invitation to telephone men. Those who have not received one are requested to write to the company for same.

The announcement is made that the Fahnestock Transmitter Company has changed its name to the Fahnestock Electric Company. There is no change of address, the company retaining the old address, 132 Havemeyer street, Brooklyn, New York.

The Swedish-American Telephone Company, Chicago, has opened a branch office at Omaha, Neb., in charge of F. M. Ferguson. Mr. C. H. Macklin, the company's general manager, visited Omaha recently to help inaugurate the new office.

The W. G. Nagel Electric Company, Toledo, Ohio, are manufacturers of the Hercules malleable iron anchor plate, which is claimed to be the most practical guy anchor on the market. It pulls against solid ground and will not creep. Information and prices sent on request.

Telephone companies, wanting certificates of stock, bonds, seals, record books, etc., should address J. W. Middleton & Company, Chicago, whose ad appears regularly in Telephony. This firm makes a specialty of catering to telephone companies and is one of the oldest in the field.

The United States Circuit Court having decided the validity of the Warner pole changer patents, the Warner Electric Company, of Muncie, Indiana, has started another factory at Windsor, Ont., to take care of the Canadian trade on its well-known ringing outfits, better known as the "Warner pole changer."

The Frankel Display Fixture Company, 718 Broadway, New York, is distributing blotters which advertise its electric testing clip. This clip is designed to make rapid tests on insulated wires without necessitating the skinning of the wire. On the front of the blotter the following remark appears: "Blot out unnecessary expense by using Frankel's Electric Testing Clip." These blotters will be sent to all parties requesting them.

The Schaper Construction Material Company, Electrical Exchange building, New York, is distributing estimate blanks which are proving a great help to companies building lines. This firm manufactures a full line of construction hardware and is prepared to quote attractive prices. Amongst other appliances which it has for sale are lag screws, fetter drive screws, marline hangers, pole steps, cross-arm braces, etc. The estimate blanks are furnished free upon request.

The Connecticut Telephone and Electric Company, of Meriden, Conn., is calling particular attention of exchange managers to its automatic branch exchange instrument recently placed on the market. It is claimed by the manufacturers to be the only telephone of its kind, which affords a metallic circuit from each telephone to the central office, local connections being made on a common return basis. A large number of exchange managers have adopted this system for the smaller branch exchanges.

The International Telephone Manufacturing Company, Chicago, has recently perfected and placed upon the market a new type permanently adjusted all-metal receiver, entirely enclosed in hard rubber shell and cap, which, it claims, is one of the best in the field. This fact seems to be evidenced by the large number of orders with which the International has been favored since introducing this receiver. The company reports a constantly increasing demand for its improved granular carbon transmitter which is adapted to any make of instrument.

Capt. W. M. Talbott, the vice-president of the Havana Subway Company, reports the work is progressing in a satisfactory manner. The contractor, George M. Painter, of Chicago, is evidently hustling things as the following extract from the Havana Telegraph seems to indicate: "The work of building the subway of Havana has begun, and more than a hundred men are now at work laying the pipes for the cables. Aguila street is the scene of great activity, and the workmen who are engaged in laying the pipes are giving the people of Cuba an object lesson in construction work. Three blocks have already been laid with pipes, and the work is progressing at the rate of a block each day."

Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., reports having closed contracts for switchboards for the following places: Varna, Ill.; Urich, Mo.; Bouton, Iowa; Atalissa, Iowa; Leonard, Mich.; Stuttgart, Kan.; Stromsburg, Neb.; Stelhensport, Ky.; Yates City, Ill.; Friendly, W. Va.; Sistersville, W. Va.; New Matamoras, Ohio; Laclede, Mo.; Long Lake, Minn.; Eureka, Utah; Payson, Utah; Richmond, Utah; Tooele, Utah; Preston, Idaho; Lowville, N. Y.; Louisville, Ky.; Attica, Ind.; Rochester, N. Y.; Robinson, Ill.; Lakewood, Ill.; Holt, Mo.; Houlton, Mo.; Bingham, Utah; Harrisonville, Mo.; Tremonton, Utah; Columbus, Ohio; Robinson, Ill.; Lakewood, Ill.; Chillicothe, Mo.; Garland, Utah.

The Swedish-American Telephone Company, whose advertisement appears in this issue, has recently made shipments of complete exchange equipment to the following named companies: Butler Telephone Company, Butler, S. D.; Huntsville Telephone Company, Huntsville, Texas; Prairie View Telephone Company, Prairie View, Kan.; Deerwood & Bay Lake Telephone Company, Bay Lake, Minn.; Farmers' Mutual Telephone Company, Dillsboro, Ind.; Hammer & Borman Telephone Company, Abercrombie, N. D.; Wheatland Telephone Exchange, Wheatland, Mo.; Red River Telephone Company, Baker, Minn.; Thornton Telephone Company, Marvin, Kan.; Western Telephone Company, Lucca, N. D.; Canton Telephone Company, Canton, Kan.; Sleepy Eye Telephone Company, Evan, Minn.; Laingsburg Telephone Company, Laingsburg, Mich.; Johnson County Telephone Company, Smartville, Neb.; Erskins Telephone Company, Dodson, La.;

Uniontown Telephone Company, Uniontown, Ala.; Arrow Rock Telephone Company, Nelson, Mo.; Connotton Valley Telephone Company, Cadiz Junction, Ohio; Sherburne County Telephone Company, Clear Lake, Minn.; Singleton Telephone Company, Stark, Kan.; Studebaker Telephone Company, Flora, Ind.; Hudleson Telephone Company, Almira, Wash.; Harris Telephone Company, Burden, Kan.; Rhodes Telephone Company, Braymer, Mo.

CROSELMIRE & ACKOR, Newark, N. J., widely known throughout the telephone field, has more than doubled its capacity within the past year. This concern exercises special care in the production of both platinum sheet and wire for the use of telephone and electrical manufacturers, and owing to their very close and direct connections abroad they ordinarily are able to get concessions in the purchases of ore, which enables them to protect customers against advances in price. However, it is a generally recognized fact that the present tendencies of the market are all toward advances for some time to come. Croselmire & Ackor number among their customers some of the largest telephone manufacturers in the west, as well as in the east. They maintain a Chicago office in charge of Messrs. A. J. Cox & Company, 1214 Chicago Stock Exchange building, Chicago.

AD. SENSE, Chicago, in speaking of the new catalogue recently issued by W. N. Matthews & Bro., St. Louis, for the advertising of their Stombaugh guy anchors, has the following: "We have just received from the Binner-Wells Company, engravers, a booklet entiled, 'Anchors that Hold.' It has a cover printed on brown stock, three tints being used to produce a pleasing decorative design, showing the practical application of the guy anchors as applied to telephone poles—rather a prosaic subject this, yet the whole booklet is an object lesson on what can be done in the way of effective booklet making with an everyday useful appliance. The illustrations are from wash drawings and photographs, vignetted halftones being used, printed in black ink; the type is printed in a warm brown. The makeup of the booklet is excellent—good, wide uniform margins, judicious use of rule work, specially designed head-line, etc."

## A NEW BAIRD SWITCHBOARD COUNTER.

A new switchboard counter has just been perfected by the Baird Manufacturing Company, 3 Michigan street, Chicago. This is a decided improvemem on the company's No. 9 counter which has been on the market so long and has given such good service.

One of these little instruments on the switchboard shelf

BAIRD NEW SWITCHBOARD COUNTER.

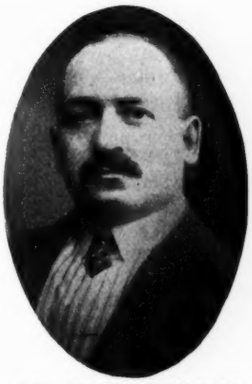
enables an operator to keep track of her calls by simply striking the peg with her finger as she makes the call. She can also, on occasion, keep track of a single subscriber's calls in the same manner. Linemen use it to count poles, insulators and all manner of line conditions where either a total or detailed count is desired.

The new counter has two registering faces. The front counts up to 100,000 and repeats. It cannot be set back. The back dials count to 1,000 and can be set back to zero at any time. One stroke operates both the back and front dials.

In factory work it is useful in counting parts. The pieces of a kind are counted in the regular way and their total taken from the back dial which is then returned to zero and another group counted. After all groups are counted the front dial registers the grand total.

The device is neat in appearance, small and light and like all the Baird specialties reflects much credit on its manufacturers.

## FRENCH CARBON IN U. S. BATTERIES.



MR. ALFRED LANDAU.

The desire of the leading French carbon makers to introduce their carbon in the United States has at last found fruition, it is said, in the establishment of the Columbia Dry Battery Company, which was incorporated recently with headquarters at 69-75 Wells St., Chicago.

French carbon is universally acknowledged throughout Europe as being of the highest class, and is universally employed upon the Continent for all purposes requiring strongest and longest life with the least deterioration. A new process has been introduced with great success in the manufacture of dry batteries, enabling the manufacturers to produce, at least, an article which meets all exacting requirements upon a very economical basis and which prevents rapid deterioration.

In choosing a field for their operations in the United States, the gentlemen who project this enterprise have selected Chicago as being a natural commercial center of a great field in which batteries are employed in large quantities. Chicago also offers them exceptional advantages because of its shipping facilities, and accommodations, not only in regard to procuring raw material and manufacturing the finished article in rapid and satisfactory style, but also as regards the receipt and prompt shipment of orders to all sections of the country. The saving of freight is also an important item which entered into consideration when the matter of a location was being determined. The Columbia Dry Battery Company is said to be backed by leading French carbon manufacturers and capitalists, and is personally managed and operated by men of high-class European education and experience. Mr. Alfred Landau, who has supervision of the new establishment, gained his knowledge of all the essential details entering into the battery business by years of study and practice in Europe. Since then, he has spent considerable time in various portions of the United States, familiarizing himself with the conditions of trade in this country before opening the factory. He announces that his factory will be conducted absolutely independent of any combination. It is the intention to manufacture batteries out of the very best French material by the new French process, the merit of which has been thoroughly proven.

The English and German automobile trade, as well as the French dealers, have had similarly gratifying experiences with these new style batteries.

In regard to the operation of the new factory at Chicago, it is stated that no expensive salesmen are to be placed on the road, and that the factory will sell direct to consumers, giving them, thereby, the benefit of this economy.

The Columbia Dry Battery Company announces that its batteries have the highest amperage, the longest and strongest life, and the most recuperative powers, as well as being the most economical to handle. The new concern launches

in business with a clean record, claiming to produce the very best in the battery line, and all they ask is a fair trial at the hands of the consumers.

Flashlight batteries of every description will also be manufactured by this concern and their equipment will enable them to meet all demands of the trade in this respect.

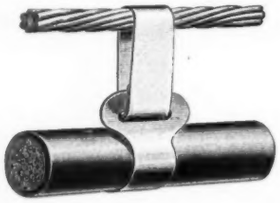
One of their strongest points will be the guaranteeing of prompt shipments, Mr. Landau announcing that they will accept no orders unless they can be filled promptly.

## YONKERS TYPE "B" CABLE HANGER.

The Yonkers Specialty Company, of Yonkers, New York, is calling particular attention to its new type "B" cable hanger. In a communication to TELEPHONY the company says:

"This is a modification of our type 'A' clip, which has been so successful. We find a greatly increasing demand for type 'B' clips, because of the fact that they are made entirely of zinc, and have no galvanized parts. Many sections of the country have such severe weather conditions that a durable cable hanger is found to be more economical than any other. There is nothing more durable than zinc, as experience has shown.

"We are enabled to manufacture these hangers cheaply,



YONKERS TYPE "B" CABLE HANGER.

and are offering them to the public at a very low price. These hangers may be easily applied by a lineman from a cable chair, and hold very securely. Another advantage is that a splicer in search of trouble and going over the cable in a chair, can ride over the support wire without difficulty, and without injury to either the hangers or the cable.

"The old idea that it was necessary to insulate the cable from the supporting wire, by marline or some such insulating device has been proved to be wrong. We grant that if it were possible to surely insulate the cable from the supporting strand that it would be desirable on many accounts to do so. But since it is not possible, it has been found it is best to make as complete a metallic connection between the cable and the supporting wire, as is possible, and to run a ground wire from both every eight or ten poles.

"The superintendent of one of the largest telephone companies in this country, recently advised us that by the use of the metallic hanger, which we furnished them, they had diminished their cable trouble from lightning and electric light wires over sixty per cent during the last year. Full information and prices on the type 'B' hanger will be sent upon request."

## IMPORTANT POLE CHANGER DECISION.

The United States Circuit Court sustains the validity of the Warner Electric Company's pole changer patents, and issues an injunction against the manufacture, sale and use of the Illinois pole changer. In anticipation of this decision the Warner company has materially increased its capacity for the manufacture of the Warner pole changer. This device is a very familiar piece of apparatus to the telephone public, and is claimed to be the standard ringing outfit for a telephone exchange. The Warner Electric Company started in business about the time of the Independent movement (eight years ago) and has steadily grown in size to its present capacity; in this time the company has put out over 8,000 of its pole changers, which sell on merit, and the satisfaction derived from their product is as gratifying to the telephone trade as it is to the company. The factories of the company are at Muncie, Ind., U. S. A., and Windsor, Ont., Canada., while the general offices are at Muncie, Indiana, U. S. A.

## WILLIAMS EXHIBIT AT PITTSBURG.

The Williams Telephone and Supply Company of Cleveland, Ohio, was represented at the Pennsylvania State Independent Telephone Association Convention by Mr. C. W. Hunt, secretary and treasurer. The company took this opportunity to display its new styles in rural switchboards, one of which was mentioned at some length in one of our recent issues. The display of telephones and switchboards evidenced the progress which is making the company an important factor in the rural telephonic field. As souvenirs the company distributed a small electro magnet from the same kind of magnet steel which is used in the manufacture of Williams' generators, and these proved attractive in more ways than one. Customers or friends not in attendance at the convention can receive some of these little souvenirs by application to the factory.

## THE STANDARD SPECIALTIES.

The Current Electric Co., 52 State street, Chicago, continues to do a steady and increasing volume of business in its pole changers and duplex sets.

These two devices have, as their name indicates, become standard apparatus in the telephone field, and as they not only give satisfaction but sell for less money than other devices of a corresponding character, their popularity is apparently deserved.

The Current Electric Company offers every reasonable inducement to parties in the market for equipment of this kind and will be pleased to furnish printed matter and full details on application. A very interesting description of the Standard Duplex set will be found in our Manufacturers' Section for October.

## IT FILLS THE BILL.

The Richards "Fit-the-Back" Telephone Operator Chair has evidently made a big hit, judging from the large number of orders and inquiries which have been received by its manufacturers since this chair was first introduced in the October issue of TELEPHONY.

The Richards chair is in every respect a high grade article, and is designed to fill all requirements of telephone operators as to health and comfort. That first-class equipment has become essential in the Independent field is again conclusively demonstrated by the reception accorded these well-built, handsome and comfortable chairs.

The Richards Chair-Panel Company is one of Chicago's best known concerns, having made thousands of its patent easy-back chairs for such corporations as the Pullman Car Company, McVicker's Theatre and others. Mr. Richards believes that the number of telephone companies in favor of good, comfortable chairs is sufficient to warrant him in cultivating this field and his success thus far has been very gratifying.

It will be noted from his advertising that a very liberal offer is made, enabling prospective purchasers to inspect and test his chairs to their entire satisfaction before payment is made.

Neat circulars, descriptive of the Richards Operator's Chair, can be had by applying to the company's general offices in the Woman's Temple Bldg., Chicago.

# Progress of the Month

## NEW COMPANIES

HOXIE, KAS.—The Valley Telephone Company has been incorporated.

TILBURY, Ont.—An Independent telephone company has been organized at this place.

HIGHLAND, KAS.—The Highland Telephone Company has been incorporated in this place.

VENUS, NEBR.—The Walnut Grove Telephone Company has been incorporated in Venus.

EXLINE, IA.—The Caldwell Mutual Telephone Company has been incorporated in this place.

PERKASIE, Pa.—The Consolidated Telephone Company has been granted permission to enter this place.

SHELDON, Ia.—The Sheldon Telephone Company has been incorporated with a capital stock of $15,000.

WINGO, Ky.—The Star Telephone Company has been organized with John Walker, of Wingo president.

ROXBORO, N. C.—The Morris Telephone Company has been incorporated with a capital stock of $100,000.

PULLMAN, W. Va.—The Washburn Telephone Company has been incorporated with a capital stock of $20,000.

NEW PRAGUE, Minn.—The Tri-County Telephone Company has been incorporated with a capital stock of $10,000.

WEBSTER, MINN.—A farmers' telephone company has been organized at this place by Frederick Dodas and Henry Menike.

MORRISTOWN, O.—A telephone company has been organized in this place to erect a line connecting this village with Bethseda.

WINGO, Ky.—The Mullin County Exchange for rural lines has been organized. R. C. Mullin of Wingo is president of the company.

BRIDGEPORT, W. Va.—The Bridgeport West Virginia Telephone Company has been incorporated at this place with a capital of $4,900.

ROCHESTER, N. Y.—The American Automatic Telephone Company has been incorporated in this city with a capital stock of $1,500,000.

WATERVALLEY, Ky.—The Kitts-Mullin Telephone Company of Wingo and Watervalley has been organized with Monroe Kitts as president.

KANSAS CITY, Mo.—The Kansas City Electric & Telephone Supply Company has been incorporated in this city, with a capital stock of $50,000.

BOISE, Idaho.—The Star Independent Telephone Company has been incorporated with a capital stock of $10,000 by H. D. Andrews and J. S. Wehr.

HALL, Ky.—The Beaver Telephone Company has been incorporated with a capital stock of $15,000. The incorporators are David Martin and others.

JAMES, Ia.—The James Telephone Company has been organized at this place with Henry Junck, president, and Frank Woolworth, secretary and treasurer.

TERRIL, Ia.—The Terril and Lake Center Telephone Company has been formed at this place, with C. M. Varney, president, and H. Everett, secretary-treasurer.

GLENWOOD, MINN.—The Glenwood Telephone Company has been incorporated with a capital stock of $12,000. M. A. Wollen and others are the incorporators.

WILLIAMSFIELD, Ill.—The Williamsfield Trunk Line Telephone Company. Capital stock, $1,000. The incorporators are C. H. Culver, J. A. Tucker and John B. Gale.

ODESSA, N. Y.—The Odessa Telephone Company has been incorporated, with the following directors: L. T. Couch, William Lattin and C. L. Frost, all of Odessa.

CHICO, Cal.—Farmers residing in this vicinity have organized for the purpose of securing telephone service and will at once begin the construction of various telephone lines.

CONEMAUGH, Pa.—The Citizens' Telephone Company has been organized by the farmers of Quemahoning and Conemaugh townships, with central office at this place.

ROBINSON, Ill.—The Crawford County Mutual Telephone Company has been organized with a capital stock of $50,000. President, F. M. Lewis; treasurer, William Long.

SELIN'S GROVE, Pa.—Application has been made for a charter for the Farmers' and Merchants' Telephone Company, which is to be operated in Snyder and Mifflin counties.

TERRE HAUTE, Ind.—The Citizens' Telephone Company, recently reorganized, has ordered plans and is now asking bids for the construction of a modern exchange building.

DEEP RIVER, Wash.—The North Shore Telephone Company of this place has filed articles of incorporation with the secretary of state, with a capital stock of $1,500. The incorporators of the company are W. N. Meserve, William Anderson, P. J. Brix, A. Olson.

MULBERRY GROVE, Ill.—The Mutual Telephone System has been incorporated with a capital stock of $2,500. The incorporators are: D. W. Brunson, J. S. Jones, L. Bosberne.

MULHALL, Okla.—The Mulhall Rural Telephone System has been incorporated with a capital stock of $5,000 by the following: G. E. Hudspeth, W. M. Peeler and C. A. Bocox.

HEPPNER, Ore.—The Hinton Creek Telephone Company has been organized at this place, with a capital stock of $1, by the following: R. F. Hynd, I. Howard and T. K. Matlock.

OSCEOLA, Ind.—The Dunlap Telephone Company has been incorporated at this place with a capital stock of $20,000. William D. Kauffman and others are the incorporators.

CHICAGO, Ill.—The Chicago Numerical Telephone Index Company. Capital stock, $50,000. The incorporators of the company are J. W. Arnett, E. C. Mapledoram, C. L. Harper.

FORT LAWN, S. C.—A company has been organized with L. Abernathy as president and M. Chapman manager. It is the purpose of the company to construct a local telephone system.

KENOSHA, Wis.—The Kenosha Home Telephone Company has been incorporated with a capital stock of $75,000. The incorporators are Alonzo Burt, James Cavanaugh and Frank Slosson.

DARLINGTON, S. C.—The Clinton Telephone Company has been incorporated. Capital stock, $25,000. The directors of the company are N. L. Harrell. W. N. Haynsworth, W. D. Coggeshall.

DRAIN, Ore.—The Drain Water Power, Light and Telephone Company has been incorporated at this place by Ira Wimberly, Benton Mires, W. W. Kent, W. C. Edwards and Sam Jones.

BLOOMING GROVE, Tex.—The Blooming Grove Telephone Company has been incorporated with a capital stock of $5,000. The incorporators are J. H. Jones, T. T. Grady and J. B. Germany.

BRONTE, Tex.—The Dixie Telephone of Coke County has been incorporated with a capital stock of $10,000. The incorporators are B. H. Rand, Bascom Lynn and D. A. Lynn, all of San Angelo.

NEW MILFORD, Ill.—The stockholders of the local telephone company recently completed the organization of the company by the election of officers preparatory to beginning construction work.

WATONGA, Okla.—The Watonga Telephone Company has been incorporated. Capital stock, $25,000. The incorporators are George Massey, George McArthur, Ed Wheelock and A. W. Sunderland.

WALTON, N. Y.—The Pine Telephone Company has been incorporated with a capital stock of $15,000. The incorporators are I. L. Brayman, Vernie Francisco, Walton, N. Y.; U. P. Dean, Goodrich, N. Y.

RANDOM LAKE, Wis.—The Random Lake Telephone Company has been incorporated with a capital stock of $5,000. The incorporators of the company are T. E. Malloy, T. D. Schmidler and W. B. Krause.

CORTLAND, Neb.—The Indian Creek Telephone Company has been organized at this place and the following officers elected: President, H. M. Huestis; secretary, B. E. Ridgeley; treasurer, B. Jackson.

KING CITY, Mo.—The King City Telephone Exchange Company has been organized with the following officers: President, John Flood; vice-president, H. Edwards; secretary and treasurer, James N. Snapp.

SHAMROCK, Tex.—The Walker Telephone Company has been incorporated with a capital stock of $10,000. The incorporators of the company are as follows: J. E. Walker, Barnett Blossom and Rea Blossom.

BRADFORD, N. Y.—The Bradford Telephone Company has been incorporated with a capitalization of $2,000. The incorporators are Fred C. Ovenshire, T. W. Chase, Bath, N. Y.; Harry Van Kueren, Sonora, N. Y.

SAULT STE. MARIE, Mich.—Local business men have started a movement to organize an Independent telephone company to compete with the Michigan Telephone Company and subscriptions for stock are being solicited.

GREEN BAY, Wis.—The Brown County Telephone Company has been incorporated at this place with a capital stock of $10,000. The incorporators are as follows: Henry F. Hagemeister, C. A. Straubel, Frank J. B. Duchateau.

LINCOLN, Kans.—A rural telephone company has been organized at this place with the following officers: President, W. T. Watson; vice president, David Sevank; secretary, R. W. Green; treasurer, T. J. Timmerman.

TAZEWELL, Va.—The Interstate Telephone Company has been incorporated at this place. Capital stock: Maximum, $1,000; minimum, $200. The officers of the company are as follows: President,

J. W. Chapman; vice-president, H. G. McCall; secretary and treasurer, George Wolf.

NEW PRAGUE, Minn.—The New Prague Telephone Company has been incorporated with a capital stock of $10,000.

RAPID CITY, S. D.—The Rapid Valley Telephone Company has been incorporated at this place with a capital stock of $10,000.

CORNWALL, N. Y.—The Cornwall Telephone Company has been incorporated at this place with a capital stock of $5,000. The incorporators of the company are as follows: W. B. Goodwin, Learned Hand, G. Morrell, New York.

GEORGETOWN, S. C.—The Home Telephone Company has been incorporated at this place with a capitalization of $16,000. The incorporators of the company are E. Rhem, W. T. Turbevill, Tolmes B. Springs, LeGrand C. Walker.

FLUSHING, O.—The Stillwater Mutual Telephone Company has been incorporated with a capital stock of $5,000. The incorporators of the company are as follows: A. W. Collins, M. O. White, T. J. Murphy, Fred A. Groves, J. H. Smith.

UNION CENTER, N. Y.—The Foster Valley Telephone Company has been incorporated, with a capital stock of $1,500. The incorporators of the company are: Vernon Cornell, Albert Mason, Jessie Walker and others, all of Union Center.

SARDINIA, N. Y.—The Erie-Wyoming Telephone Company has been incorporated in this city with a capital stock of $10,000. The directors of the company are as follows: R. N. Allen and A. W. Phelps, Chaffee; H. B. Freeman, Sardinia.

NASHVILLE, Tenn.—The W. C. Cole Telephone Company of Decatur County has been incorporated with a capital stock of $3,000. The incorporators of the company are W. C. Cole, John U. Speer, L. A. Raines, L. H. Burk and Frank Kent.

PORTLAND, Me.—The South Porto Rico Telephone Company has been incorporated. Capital stock $30,000. The officers of the company are as follows: President, H. L. Cram; treasurer, A. F. Pine; clerk, C. D. Booth, all of Portland.

LAS CRUCES, N. M.—Permission to do business in Texas has been granted the Texas & New Mexico Telephone Company of this city. The capital stock of the company is $15,000 and the headquarters will be located at El Paso, Texas.

EDGAR, Wis.—Articles of incorporation have been filed for the Edgar, Cassel and Emmet Telephone Company, with a capital stock of $1,500. The incorporators of the company are: C. C. Barret, Otto Fehlhaber and W. W. Gamble, all of Edgar.

OREGON, Ill.—Articles of incorporation have been filed for the Killbuck Telephone Company, with a capital stock of $1,500. The incorporators are as follows: E. A. Foster, T. H. Lines, G. A. Sawber. The main office will be at Monroe Center.

CENTER LOVELL, Me.—The Lovell Telephone & Telegraph Company has been organized here with a capital stock of $5,000. The officers of the company are as follows: President, C. B. Hubbell, of Lovell; treasurer, J. C. Mason, of North Lovell.

FORSYTH, MONT.—Articles of incorporation for the Forsyth Telephone Company, with a capital stock of $20,000, have been filed with the county clerk. The incorporators of the company are J. E. Edwards, C. M. Blair and Frederic Collins.

LARIMORE, N. D.—The Larimore Telephone Exchange Company has been incorporated at this place with a capital stock of $15,000. The incorporators of the company are as follows: Edward Litton, Rose G. Litton, Elizabeth A. Litton, all of Larimore.

WINCHESTER, Va.—The United Frederick & Clark Telephone Company has been incorporated at this place with a capital stock of $1,000. The officers of the company are as follows: President J. H. Funkhouser; secretary and manager, P. H. Funkhouser.

PLAINVILLE, N. Y.—The Plainville & Meridian Telephone Association has been incorporated, with a capital stock of $1,200. The incorporators of the company are Geo. W. Simmons, Geo. R. Calkins, Cato, N. Y.; Charles P. Davis and others of Plainville.

CARRINGTON, N. D.—The North Dakota Central Telephone Company has been incorporated with a capital stock of $50,000. The incorporators of the company are C. E. Leslie, M. J. Leslie, C. C. Leslie, Carrington, N. D.; O. L. Robinson, Madison, Wis.

BUTLER, S. D.—The Butler Telephone Company has been formed at this place with a capitalization of $10,000. The officers of the company are as follows: President, L. C. Goodel; vice-president, P. M. Bezansoe; secretary and treasurer, N. E. Bjerke.

DENMARK, Me.—The Denmark Telephone Company has been incorporated, with a capital stock of $10,000. The officers of the company are as follows: President, E. L. Head, Denmark; treasurer, C. L. Wentworth; clerk, M. M. Wentworth, Denmark.

WATERLOO, Ill.—At a recent meeting of farmers the Floraville Rural Telephone Company was organized to construct telephone lines. One line will be built through St. Clair county to Belleville, and another will connect with the Waterloo farmers' telephone line.

SEATTLE, Wash.—The Seward Co-operative Telephone Company has been incorporated at this place with a capital stock of $25,000. The incorporators of the company are as follows: H. C. Ewing, William M. Calhoun, C. D. Haskins, F. E. Brightman and A. J. Tennant.

RITCHEY, Mo.—The Newton County Enterprise Telephone Company has been incorporated at this place with a capital stock of $3,500. The incorporators of the company are F. A. Boehning, J. B. Hancock, W. I. Pogue, J. M. Curtis, Fred Chandler, F. E. Wasson and others.

NASHVILLE, Tenn.—The secretary of state has granted a charter to the Farmers' and Merchants' Telephone Company of Stewart County, with a capital stock of $500. The incorporators of the company are H. A. Cansey, F. P. Edwards, Joe Gray, S. B. Hayes and Joe Melton.

LOS ANGELES, Cal.—The Home Telephone Construction Company has been incorporated, with a capital stock of $500,000, of which $1,500 has been subscribed. The directors of the company are as follows: Carl L. Doron, C. G. and M. Andrews, Philo Jones and J. G. Doron.

GATE CITY, VA.—The Gate City Telephone Company has been incorporated with a capital stock of $5,000. The officers of the company are as follows: President, O. H. Gobble, Clinchport; vice-president, W. D. Smith; secretary and treasurer, J. M. Minnich, of Gate City.

MINNEISKA, MINN.—The Valley Telephone Company recently incorporated at this place has elected the following officers for the ensuing year: President, F. E. Hartman; vice-president, M. Heaser; secretary and treasurer, John Peshon; directors, Peter Nepper and John Heaser.

HOBART, Okla.—The telephone war which has been raging at Hobart for some time is about to be settled. The committee from the Commercial League has succeeded in securing enough subscribers to organize a new company composed of local business men, and a new system will be put in at once.

ELLICOTTSVILLE, N. Y.—The Home Telephone Company has been incorporated here, with a capital stock of $10,000. The directors of the company are as follows: T. S. Lane of Jamestown; W. B. Page, Frederick L. Keith, Walter Page, A. M. Ellis, Geo. W. Houck and Eugene Rust of Ellicottsville.

COLQUITT, Ga.—The Colquitt Telephone Company, composed of business men of this place, will install a local telephone system. The following compose the company: C. C. Bush, N. L. Stapleton, W. L. Geer, W. C. Dancer, J. S. Bush, E. D. Bush, Joe Tole, J. M. Shingler, M. D. Roberts, J. L. Tabb, W. J. Ballard.

WEATHERFORD, Okla.—The Farmers' Mutual Telephone Exchange of Custer County has been incorporated with a capital stock of $25,000. The directors of the company are R. X. Wade, W. T. Bradley, J. T. Bradley, C. H. Taylor, C. E. Carper, B. H. Buschman, J. S. Wilkes, J. H. Anderson and W. M. Stoneall of Weatherford.

CHEYENNE, Wyo.—The Badwater Telephone Company has been incorporated, with a capital stock of $5,000. The trustees elected for the first year are as follows: George A. Davis, Charles Bader and Andrew J. Crossley. The Wyoming agent of the company is Andrew J. Crossley, and the office of the company is located at Lost Cabin.

EAST CONCORD, N. Y.—The East Concord Telephone Company has filed articles of incorporation with the County Clerk. The capital stock is $5,000. The directors of the company are: J. L. Smith, Samuel D. Vance, Ward H. Marse, and Fred T. May, of East Concord; George J. Domes and A. E. Spencer of Sardinia and L. A. Vaughan of Concord.

NORTH WOLCOTT, N. Y.—Certificate of corporation has been filed by the Red Creek and North Wolcott Telephone Company. Capital stock, $500. The directors of the company are: Burton Ford, Nathaniel J. Field, Charles J. Weaver, of North Wolcott; Orson Amidon, Newton J. Robertson, Adelbert Chapman and Harvey H. Sharp, of Red Creek.

WEATHERFORD, Okla.—The United Telephone & Telegraph Company of Elk City has been incorporated, with a capital stock of $100,000. The incorporators are as follows: G. F. Patterson, M. F. Spurlock, E. M. Scannell, Charles McLoud, T. J. Baldwin, Joe Scannell, and M. Scannell, all of Elk City; W. T. Patterson and W. M. Scannell of Weatherford.

NEW YORK, N. Y.—The Cornwall Telephone Company has been incorporated with a capital stock of $5,000. The incorporators of the company are as follows: William B. Goodwin, Learned Hand, Gerald Morrall and Walter Cox, Jr., all of New York; James B. Boyd, Bayonne, N. J.; Harry J. Becker, Paterson, N. J.; Fred Hindebrandt, Rosebank, N. Y.

CORONA, Cal.—Articles of incorporation of the Corona Home Telephone & Telegraph Company have been filed in the county clerk's office. The capital stock of the company is $25,000, of which $5,860 has been subscribed. The directors of the company are: A. C. Wood, J. C. Gleason, R. J. Billings, S. S. Willard, F. A. Perkins, John C. Triola and W. J. Pentelow.

EARL, ARK.—Articles of incorporation of the Earl & Tyronza Telephone & Telegraph Company, have been filed with the secretary of state. The capital stock of the company is $5,000, all of which has been subscribed and $2,500 paid in. The incorporators of the company are: John F. Rhodes, president and treasurer; H. A. Morrison, vice-president; John M. Taylor, secretary.

LONG GROVE, Ia.—Articles of incorporation have been drawn up for the Long Grove Mutual Telephone Company, with a capital stock of $10,000, $3,000 of which is paid in. The officers of the company are as follows: President, R. K. Brownlie; vice-president,

Leonard Litscher; secretary and treasurer, Dr. G. B. Maxwell; trustees, William Reimers, Gustave Helken, James Wyer and Edward Elmegren.

EARLING, Ia.—The Earling Telephone & Telegraph Company has been incorporated at this place with a capital stock of $3,000, with the following officers: President, P. J. Korth; secretary, N. V. Kuhl.

LEITER'S FORD, Ind.—The Leiter's Ford Telephone Company has been incorporated with a capital stock of $2,000. The directors of the company are: B. F. Overmeyer, J. B. Campbell, C. E. Anderson. It is the purpose of the company to establish telephone service in Leiter's Ford and throughout Fulton county.

AUSTIN, Tex.—Articles of incorporation of the South Texas Telephone Company have been filed with the secretary of state, with Austin as headquarters, and a capital stock of $400,000 divided into shares of $1,000 each. The incorporators of the company are as follows: J. A. Quisenberry, Danville, Ky.; A. E. Schafer, Wapakoneta, O.; J. E. Boynton, Waco; F. C. Smith, San Antonio; W. B. Stephens, San Antonio.

SHERMAN, Mich.—Articles of incorporation have been filed for the Wexford County Independent Telephone Company. The capital stock of the company is $1,000, to be increased to $5,000 by another year. The officers of the company are as follows: President, G. A. Lake; vice-president, A. B. Southwick; secretary, D. L. Rose; treasurer, R. D. Frederick; trustees, Oscar Litchard, A. O. Light and James Kellogg.

HUNTINGBURG, Ind.—The Pocket Long Distance Telephone Company has been organized at this place. The capital stock of the new company has been placed at $20,000. The following directors were chosen: Allen Gray, Evansville; R. M. Parrett and John W. Ewing, Princeton; Philip Dilley and H. Landgrebe, Huntingburg; George J. Nichols, Petersburg; A. J. Payton, Rockport. The headquarters of the company will be Evansville.

OREGON CITY, Oreg.—Steps are being taken toward the organization of a company in this city for the purpose of installing a mutual telephone exchange as a connecting link for the successful operation of the rural telephone system in Clackamas county. It is the purpose to form a company with a capital stock of $7,500 and install an exchange having 150 telephones. Through this system a large number of farmers will be connected with this city.

HARTFORD, Conn.—Parties interested in the organization of an Independent telephone company in this city have asked for a charter for the new Citizens' Telephone Company, which will enable the company to start with a capitalization of $1,000,000, with the privilege of raising it to $10,000,000. In case the charter is granted it is the intention of the company to give the state one of the most up to date and thorough telephone systems possible. D. A. Reynolds of the State Line Telephone Company of New York City is one of the chief promoters of the enterprise.

CLEVELAND, O.—Steps are being taken for the organization of a new company to take over the properties owned by the Federal Telephone Company. Complete details have not been worked out, but it seems assured that the old company will be wiped out and a new company formed. The new company will have additional outside capital, which will be sufficient to put it on its feet and develop its properties. Expert accountants are now going over the books of the company and its subsidiary companies for the benefit of outside interests, which expect to come into the new organization.

## ELECTIONS AND MEETINGS

BEATRICE, Neb.—The Highland Independent Telephone Company has elected officers as follows: President, C. R. Stewart; secretary-treasurer, L. Greiser.

PRESTON, Wis.—The Annaton-Preston Telephone Company has elected officers as follows: President, J. R. Monteith; vice-president, Tom Watchern; secretary-treasurer, W. H. Finnegan.

GRAFTON, W. VA.—The Consolidated Telephone Company has elected the following officers: President, C. B. Manley; vice-president, J. J. Alexander; secretary-treasurer, W. H. Finnegan.

LITTLE VALLEY, N. Y.—The Little Valley Telephone Company recently incorporated has elected the following officers: President, A. E. Darrow; secretary, E. M. Marrill; treasurer, S. N. Wheaton.

OZARK, Mo.—At the annual meeting of the stockholders of the Ozark Telephone Company the following officers were elected: President, S. Y. Burke; vice-president, J. S. Phillips; secretary, Lou Gladson; treasurer, J. W. Collins.

GREENVILLE, Pa.—The West Salem Telephone Company, recently organized, has elected the following officers: President, S. K. Parker; secretary and treasurer, John F. Melvin; directors, W. S. Ferguson, Milo Brown, William Collins and Andrew Brown.

MORA, Mo.—The promoters of the Mutual Independent Telephone Company of this place recently met and elected the following officers: President, John M. Moss; vice-president, H. H. Schnackenberg; secretary, Dr. H. P. Guthrie; treasurer, Arthur O. Farrell.

DALLAS, Tex.—The Texas Independent Telephone Association recently held its meeting in this city and perfected the organization of the Independent Telephone Clearing House, which is to be established in Dallas. The following officers have been elected: President, Cecil L. Simpson of Dallas; vice-president, E. P. Butler of Gainesville; secretary and treasurer, E. W. Dunaway of Paris. The directors decided upon Waco for the next place of meeting, at such time as the executive committee shall decide.

EVANSVILLE, Ind.—At a meeting of the directors of the Pocket Long Distance Telephone Company, recently organized, the following officers were elected: President, Allen Gray, Evansville; vice president, R. N. Parrett, Princeton; treasurer, Henry Landgrebe, Huntingburg; H. C. Rothert, Huntingburg.

RACINE, Wis.—At a recent meeting of the stockholders of the Citizens' Telephone Company the following officers were elected: President, John B. Simmons; vice-president, Josiah Hocking; secretary, G. V. Kradwell; treasurer, C. R. Carpenter; directors, John B. Simmons, C. L. Shoop, Josiah Hocking, Jacob Stoffel, Jr., William Von Middlesworth.

ST. LOUIS, Mo.—The Telephone Construction Company, which was recently incorporated in this city with a capital stock of $15,000, has completed its organization by the election of the following officers: President, Charles Sutter; vice-president, R. F. Spencer; secretary, J. L. Herman; treasurer, J. H. Murphy; general manager, J. Schatzman; consulting engineer, Maxime Reber.

CHARLOTTESVILLE, Va.—The stockholders of the Albemarle Telephone Company recently held their annual meeting in this city and officers of the ensuing year were elected as follows: President, F. W. Twyman; vice-president, J. B. Andrews; directors J. M. Robertson, J. B. Andrews, Daniel Harmon, P. Leterman, T. J. Wills, Thomas S. Kekler, C. H. Walker, S. C. Chancellor, John B. Moon, James F. Harlan, W. J. Tyson, F. W. Twyman.

INDIANAPOLIS, Ind.—New officers and directors have been elected for both the Indianapolis Telephone Company and the New Long Distance Telephone Company. Of the former, H. C. Stifel of St. Louis, is president; James P. Brailey, Jr., of Toledo, vice-president; John H. Holliday of Indianapolis; A. H. Bauer of St. Louis, additional directors. The officers of the New Long Distance Telephone Company are as follows: President, H. C. Stifel; vice-president, C. Marquard Foster of St. Louis; Breckenridge Jones, J. P. Brailey, Jr., A. F. Ramsey, M. B. Wilson and Louis Hollweg, additional directors.

## ORDINANCES AND FRANCHISES

UNDERWOOD, N. D.—A franchise has been granted the Missouri Valley Telephone Company.

ARDMORE, I. T.—The council has granted a telephone franchise to F. B. McElroy and associates.

MENA, Ark.—The Mena city council has granted a new franchise for fifty years to the Kizer Telephone Company.

SPRING GROVE, Ill.—The Spring Grove Telephone Company has been granted a franchise in the village of Richmond.

COFFEYVILLE, Kan.—The Home Telephone Company has been granted a franchise to establish a telephone system in Coffeyville.

EUREKA, Cal.—Mr. Stephen Fleming has applied for a telephone franchise to conduct a telephone line from Blocksburg to Carlotta.

WEST PALM BEACH, Fla.—Dr. J. E. Liddy and associates will make application for a franchise to construct and operate a telephone system.

PIERRE, S. D.—The Great Western Telephone Company, which proposes to build a line from Pierre to the Black Hills, has applied for a franchise at Pierre.

EUREKA, Cal.—The county supervisors have advertised for bids for a franchise to erect and maintain telephone lines along the public roads from Blocksburg to Carlotta in Humboldt county.

NORTH VANCOUVER, B. C.—The council has expressed its willingness to grant exemption from taxation and license fee for five years for the immediate installation of a telephone system.

SAN LUIS OBISPO, Cal.—The board of supervisors has granted the application of E. D. Warner and others to construct a private telephone line along the ditch of the Arroyo Grande Ditch Company.

ONTARIO, Cal.—A franchise for a telephone system has been sold to D. B. Winn of Oklahoma. The price paid for the franchise was $1,475, the highest of any in southern California, except that of Los Angeles, for which $3,080 was paid.

SEATTLE, Wash.—At a recent meeting of the council an ordinance was introduced empowering Superintendent Walters, of the street department, to proceed immediately with the installation of a complete exchange telephone service of the Independent Telephone Company, connecting all the fire houses with headquarters.

COLDWATER, Mich.—At a recent meeting of the city council an ordinance was presented authorizing the Wolverine Telephone Company to erect, maintain and operate a telephone and telegraph system and exchange in this city, said ordinance to take effect on the 23d of November upon the filing by the said company of acceptance thereof in the office of the city clerk within thirty days after final passage.

KENOSHA, Wis.—Petitions have been circulated asking the council to render void all franchises under which the telephone companies are working. It is alleged that the merger of the two companies, which has just been accomplished, is in direct opposition to the provisions under which the Citizens' Telephone Company had been doing business, as the franchise provides that should the com-

pany sell out or form a combination so as to eliminate competition, the franchise is void. Attorney John C. Slater will at once take steps to prevent the new company from using the lines of the Citizens' Company.

SPRINGFIELD, Tenn.—At a recent meeting of the city council it was unanimously decided not to interfere with the franchise granted to the Home Telephone Company about one year ago to do business in Springfield. For some time petitions have been circulated asking the council to declare the franchise of the Home company forfeited because of failure to take advantage of the rights granted within a reasonable time. By its action the council holds that a reasonable time in which to begin building has not expired and the Home company may proceed to comply with the terms with the support of the town authorities. E. L. Barber and A. L. Tetu of the Nashville Home Telephone Company are behind the company.

## NEW CONSTRUCTION

PLAINWELL, Mich.—The Norton Rural Telephone Company will build an exchange in this city.

DAYTON, Wash.—Another rural telephone line will be built to connect with the Dayton exchange.

FREDONIA, Kan.—The Fredonia Telephone Company will construct a telephone line southeast of Fredonia.

WAYNE, Mich.—The People's Telephone Company of this place will build a line from Carlton to Ash Center.

BIGELOW, MINN.—William Widman and others are making arrangements to establish a telephone exchange in this place.

SKOWHEGAN, Me.—The Somerset Farmers' Co-operative Telephone Company will build a line from this place to Lakewood.

HATTIESBURG, Miss.—A company is being organized for the construction of a telephone system from Hattiesburg to Mobile, Ala.

PULASKI, Tenn.—The Long Distance Telephone & Telegraph Company of Birmingham, Ala., will install an exchange at this place.

ALBANY, N. Y.—The Independent Union Telephone Company of this city will erect a new exchange building for its long distance service.

CRESCO, Ia.—The telephone exchanges at Cresco, Chester and Lime Springs have been purchased by Edward Hurmence and V. H. Stevens.

JACKSON, Tenn.—The Home Telephone Company has just completed a long distance line to Memphis and will construct other long distance lines.

BOISE, IDAHO.—The Idaho Independent Telephone Company of this city has advertised for bids for the construction of a telephone exchange building.

MILACA, MINN.—The Twin City Telephone Company, which recently purchased the local telephone system, has begun extensive improvements on the plant.

SIOUX CITY, Ia.—Construction work has been begun on the new Independent toll line which will connect Sioux City with Yankton and Sioux Falls, S. D.

GULF CITY, Fla.—Capt. W. W. Phipps of this city will soon begin the erection of a telephone line from Palmetto to his home, a distance of about sixty miles.

NELSON, Wis.—The farmers of this section have purchased the telephone line formerly owned by Dr. Asbury and will form a stock company and extend the service.

PADUCAH, Ky.—The Paducah Home Telephone Company will soon begin the construction of a line to Cairo, Illinois, which will give the local office an outlet to St. Louis.

CHELMSFORD, Mass.—A meeting of the Chelmsford Telephone Association was held recently for the purpose of discussing and formulating plans for the extension of its lines.

LANCASTER, N. Y.—The Inter-Ocean Telephone Company has begun the construction of its new exchange at this place. The line will be extended to connect with Buffalo.

LENOX, O.—Farmers of this locality are contemplating the construction of a telephone line in the near future.

EARLVILLE, Ia.—The Interstate and Delaware County Telephone companies have consolidated their lines in this county, and hereafter the same central office will be used for both.

PULASKI, N. Y.—The Black River Telephone Company, which has an exchange in this city, has commenced the construction of a telephone line between Rochland and Williamstown.

SAVANNA, Ill.—The Carroll County Independent Telephone Company will construct a number of toll lines in the county. The expenditure of several thousand dollars is contemplated.

DETROIT, Mich.—The Peninsular Telephone Company is making rapid progress in the construction of its three copper lines which are to run from Detroit through Pontiac to Flint Owosso.

RAYONES, STATE OF NUEVA LEON, Mex.—Francisco C. Ramos has applied to the federal government for a concession to build and operate telephone and telegraph lines in this section of the state.

VERA CRUZ, Ind.—The German Telephone Company, which is building a line from Vera Cruz to Craigville, has a bright outlook for a prosperous business in the future and a good field open for rural lines. The company already has about seventy-five subscribers for farm lines to be installed as soon as they can be put in, which will be when the line from Craigville to Vera Cruz is finished.

TICONDEROGA, N. Y.—The Ticonderoga Home Telephone Company is constructing a line to Crown Point and when this is completed the company will begin the construction of lines to Schroon and Hague.

PETERSBURG, Ill.—The Petersburg Telephone Company has constructed a new line between Athens and Petersburg. When completed it will be used as a toll line and the present one will be converted into a farmers' line.

SLEEPY EYE, Minn.—The Sleepy Eye Telephone Company is extending its rural lines and has one of the best Independent rural systems in operation in this part of the state. The company will build a branch exchange at Evan.

MEADOWS, Idaho.—The Meadows-Whitebird Independent Telephone Company has begun the construction of its system. The company has $1,800 in the treasury and enough stock has been disposed of to insure the completion of the system. T. B. Snyder is interested in the enterprise.

COUNCIL BLUFFS, Ia.—The Council Bluffs Independent Telephone Company has let the contracts for the construction of its exchange building to Wichhan Bros. and P. H. Wind. The estimated cost of the building is $14,000, and the same is to be completed and ready for occupancy by February, 1906.

SHELBY, Mich.—Farmers in the vicinity of Shelby, Ferry and Eldbridge are preparing to construct a telephone line to Shelby which will be a part of the system of the Oceana Farmers' Mutual Telephone Company. The latter company is negotiating for the purchase of toll lines to Shelby, Pentwater and Mears.

## EXTENSIONS AND IMPROVEMENTS

YERINGTON, Nev.—The Yerington Electric Company will extend its telephone line.

RALSTON, Pa.—The Ralston Telephone Company will make a number of extensions.

PARKER'S PRAIRIE, Minn.—A telephone line will be constructed from this place to Urbank.

BLAIR, Neb.—The Blair Telephone Company will make numerous improvements of its system.

DUNLAP, Ill.—The Dunlap & Alton Telephone Company is rebuilding a number of its lines.

SCHULENBERG, Tex.—The Fayette County Telephone Company will extend its system to Weimer.

GREENBUSH, O.—The Preble County Telephone Company will make a number of additions to its lines.

SAYRE, Pa.—The Valley Telephone Company has installed a new switchboard with a capacity of 3,000.

OAKLAND, Ill.—The Home Telephone Company has applied for a franchise to install a local telephone system.

MACON, Mo.—The Macon Telephone Company has purchased a site and will erect a new exchange building.

GALLIPOLIS, O.—The Gallipolis Telephone Company will make improvements in both its local and long distance lines.

PINCKNEYVILLE, Ill.—The Pinckneyville Telephone Company will make application for a twenty year franchise in this city.

TABLE ROCK, Neb.—The Table Rock Telephone Company is making extensive improvements in its system in this city.

TICONDEROGA, N. Y.—The Ticonderoga Telephone Company, recently incorporated, has secured a franchise in this city.

WAYNE, N. Y.—The Wayne-Monroe Telephone Company will build a line to Rochester and will also make other extensions.

MORRISTOWN, Tenn.—The Citizens' Telephone Company of this city is extending its line from Galbraith Springs to Rogersville.

STANTONVILLE, Tenn.—The Stantonville Telephone Company is extending its lines to Parsons with a view to putting in an exchange at that place. The company will also extend its lines to Camden.

WOODBINE, Ia.—The Woodbine Telephone Company is preparing to extend its lines so as to connect with the Missouri Valley lines.

WATSON, Mo.—The New Mutual Telephone Company has under consideration the construction of a line from Watson to Rockport

BURTON, O.—The Burton Telephone Company is building new lines into Middlefield and is extending a line south to Parkman.

TROY, Idaho.—The Interstate Telephone Company is preparing to extend its system to this place and establish an up to date exchange.

FREMONT, Neb.—The Fremont Telephone Company is enlarging its switchboard capacity to enable it to take care of its increasing business.

SASKATOON, Sask.—The Saskachewan Telephone Company is preparing to build long-distance telephone lines to several adjacent towns.

SIBLEY, Ia.—The Western Electric Telephone Company is rebuilding and improving its toll system in order to improve its long-distance service.

BOLSTER'S MILLS, Me.—The Bolster's Mills Telephone Company is extending its lines and will connect with the Eastern Telephone Company at Norway.

SUSSEX, N. B.—The Central Telephone Company has arranged

to extend its lines so as to give connection with Dalhousie, Campbellton and other points.

SPOKANE, Wash.—The Interstate Co-operative Telephone Company of Moscow, Idaho, contemplates extending its lines to this city within the next year.

PARK CITY, Utah.—The Utah Independent Telephone Company is engaged in installing its system in this city. The new exchange building is almost completed.

MONTROSE, Miss.—The Jasper County Telephone Company has made connection with Newton and will at once extend the line south by way of Louin to Bay Springs.

ITASCA, Tex.—A number of improvements and extensions are being made by the Citizens' Telephone Company of Itasca. A number of toll lines are being added.

REDWOOD FALLS, Minn.—The Minnesota Central Telephone Company will construct a central energy telephone system in this city, replacing the old exchange now in use.

WABASH, Ill.—Work on improvements to cost $100,000 has been commenced by the Wabash Valley Telephone Company. A new conduit system is included in the improvements.

STREATOR, Ill.—The Sreator Independent Telephone & Telegraph Company, which has recently assumed control of the exchange in this city, will make extensive changes and improvements.

STEPHENVILLE, Tex.—The Stephenville Telephone Company has just enlarged its switchboard capacity and increased the number of its subscribers. W. H. Crouse is manager of the company.

OAKTOWN, Ind.—The Oaktown Telephone Company is overhauling its plant and installing new equipment, including a new switchboard. The company will also construct additional lines.

BOISE, Idaho—The Independent Telephone Company will install a new central energy switchboard in its exchange at this place, with a capacity of 12,000 telephones, at an estimated cost of $20,000.

LANDIS STORE, Pa.—A party from Sassamansville is interested in the promotion of a telephone line extending from this place to Barto. If sufficient stock can be secured, the line will be erected at once.

DALLAS, Tex.—The long-distance telephone line which has been under construction for some time between Dallas and Ft. Worth, by the Texas Consolidated Long Distance Telephone Company, is about completed.

EAST ORANGE, N. J.—At a meeting of the directors of the Federal Telephone Company, recently held at this place, the old officers were re-elected. F. S. Dickson is president and E. W. Moore general manager.

ENOSBURG FALLS, Vt.—The Northern Telephone Company, through its representative, C. L. Ovitt, has purchased a site and will erect a new exchange building in the spring to accommodate its rapidly growing business.

BURLINGTON, Ia.—The Mississippi Valley Telephone Company of this city is planning many new improvements in its service. Lines are being built, connecting with many different towns in eastern Iowa and western Illinois.

MARATHON, N. Y.—The Marathon-Killawog Telephone Company has placed an order for a new switchboard for its exchange in this city, and expects to install 300 telephones in southern Cortland and northern Broome counties.

MONTICELLO, Ind.—A traffic arrangement has been effected between the Monticello Telephone Company and the Yoeman Telephone Company, both of White county, and a toll line connecting the two companies will be built.

ARLINGTON, Kan.—The Arlington Telephone Company is building a new exchange building. Additional lines being built and wishing exchange with the Arlington exchange, made it necessary for the company to enlarge its facilities.

ROCKFORD, Ill.—The Winnebago County Telephone Company has been extending its service to such an extent that it has become necessary to appoint an assistant general manager and W. Sanford Campbell has been chosen to fill the position.

PHILBROOK, Minn.—The directors of the Philbrook Telephone Company recently held a meeting at Browerville to take steps towards providing means for the completion of its line and to arrange for connection with the Browerville exchange.

BELVIDERE, Ill.—At a recent meeting the stockholders of the Belvidere Telephone Company authorized the board of directors to issue bonds to the amount of $50,000, for the installation of a new telephone system or rebuilding the lines of the company.

CANAL DOVER, O.—The Tuscarawas Telephone Company is planning some important changes which will involve the improvement of its plants at New Philadelphia, Uhrichsville, and Canal Dover. The Dennison exchange will be abandoned and consolidated with the Uhrichsville plant.

CANTON, O.—The Stark County Telephone Company will make extensive additions to its switchboard capacity in this city and Alliance. Sixty-eight thousand feet of cable will be used in Canton and 2,600 feet in Alliance. At present there are 3,723 telephones in service in Canton and 1,100 in Alliance.

BOISE, Idaho.—The Idaho Independent Telephone Company recently filed a trust deed of $500,000 to secure funds for the purpose of extending the company's lines in all directions. It is stated that a telephone line from Salt Lake City on the east to Portland on the west is contemplated, work to begin on a portion of the extensions in the near future. A franchise has been secured for an exchange at Caldwell, work to begin at once, and exchanges will be installed at Mountainhome and Weiser as soon as necessary arrangements can be made.

SUSQUEHANNA, Pa.—At the annual meeting of the Susquehanna Telephone & Telegraph Company the following directors were elected for the ensuing year: E. W. Jackson, Frank Zeller, M. H. Eisman, M. J. Ryan, M. J. Lannon, Dr. S. S. Simmons; auditors, Dr. J. D. Kelly, C. I. Fisher, C. E. Titsworth.

OROVILLE, Cal.—A new and up to date telephone system will be installed in this city. The company will expend in the neighborhood of $10,000 in installing the system. The business of the company has grown so rapidly that it has become necessary to increase the facilities. Among the improvements planned will be the installation of a new multiple switchboard.

CHARLESTON, W. Va.—The stockholders of the Charleston Home Telephone Company held their annual meeting in this city and elected the following directors: J. M. Payne, E. A. Barnes, J. F. Brown, F. M. Staunton, of Charleston; D. E. Sapp and F. L. Beam, of Mt. Vernon, O.; W. W. Morrison, of Toledo, O.; I. E. Gardner, of Bryan, O.; and Cyrus Huling, of Columbus, O.

PHILADELPHIA, Pa.—The Keystone State Telephone & Telegraph Company is doing a great deal of extension work in the surrounding counties. A line has been completed to Newton, and a new exchange installed at that place. Three additional exchanges will shortly be established at other points. The increased conduit, cable and switchboard capacity gives the company facilities for a large increase in its business.

PARKERSBURG, W. Va.—At a recent meeting of the board of directors of the West Virginia Western Telephone Company it was decided to install three new exchanges, one at Sisterville, one at Friendly and one at New Matamoras. Other improvements will also be made. The directors of the company are as follows: A. C. Davis, G. D. Jeffers, B. S. Pope, C. T. Hiteshew of Parkersburg; R. H. Browse of Grape Island; H. G. Feller, St. Marys; R. H. Rutherford, Zanesville; J. P. Sharp, Waverly; J. E. Carle, Eatons; J. H. Lininger, Harrisville; Richard Wandless.

COLORADO CITY, Tex.—During the past year the Texas & Pacific Telephone Company has made numerous extensions, having expended something over $5,000 for this purpose alone, and added over 240 telephones to its service. For the coming year it is proposed to expend twice this sum in extensions and improvements. Among the improvements will be included a 500-drop switchboard for the Colorado exchange and about 300 telephones. The company is constructing a metallic line from Midland to Abilene. Later it is the intention to add a copper circuit on same poles, and to construct something like 50 miles of toll lines. Few, if any, telephone companies in Texas have made such rapid growth as this company. R. M. Webb is manager of the company.

## FINANCIAL NOTES

VIENNA, Ill.—The Interior Telephone Company has increased its capital stock to $50,000.

SIBLEY, Ill.—The Sibley Telephone Company has increased its capital stock from $4,000 to $12,000.

INDIANAPOLIS, Ind.—The New Long Distance Telephone Company has just paid its November dividends.

WASHINGTON, Ind.—The Daviess County Home Telephone Company has issued $100,000 preferred stock.

CHARLOTTEVILLE, N. Y.—The Charlotte Valley Telephone Company will increase its capital stock to $10,000.

GRANVILLE, N. Y.—The Granville Telephone Company has increased its capital stock from $50,000 to $250,000.

CADIZ, O.—The Harrison County Telephone Company has increased its capital stock from $50,000 to $100,000.

DAYTON, O.—The Dayton Southwestern Telephone Company has increased its capital stock from $150,000 to $750,000.

COLUMBUS, O.—The Columbus Citizens' Telephone Company has declared its regular quarterly dividend of 1 per cent.

NEW BEDFORD, Mass.—The New Bedford Automatic Telephone Company has declared its regular quarterly dividend of 1 per cent.

KANSAS CITY, Mo.—The receipts of the Kansas City Home Telephone Company for the last three months amount to $107,854.59.

GRAND RAPIDS, Mich.—The Citizens Telephone Company has just paid its thirty-third consecutive quarterly dividend to the stockholders.

OLYMPIA, Wash.—The Olympia city council has passed an ordinance granting the Sumner Automatic Telephone Company a thirty-five year franchise.

DALLAS, Tex.—The Texas Consolidated Long Distance Telephone Company has amended its charter increasing its capital stock from $60,000 to $120,000.

NEW LEXINGTON, O.—The Perry County Telephone Company has increased its capital stock from $35,000 to $50,000. William A. Allen is president of the company.

MINNEAPOLIS, Minn.—The Cannon River Telephone Company

has filed an amendment with the secretary of state increasing its capital stock from $15,000 to $60,000.

CENTRAL FALLS, R. I.—An effort is being made to secure the appropriation of $3,000 for the purpose of establishing a police telephone and telegraph system in this city.

PETOSKEY, Mich.—The Petoskey Independent Telephone Company contemplates the expenditure of several thousand dollars in the improvement and extension of its system.

QUINCY, Ill.—The Quincy Automatic Telephone Company has increased its capital stock from $15,000 to $1,000,000, and has changed its name to the Quincy Home Telephone Company.

CARL JUNCTION, Mo.—The Spring River Mutual Telephone Company of this place has been granted permission to construct a telephone line from Carl Junction through Waco to Asbury.

ST. JOSEPH, Mich.—The Twin City Telephone Company of St. Joseph and Benton Harbor contemplates the expenditure of $33,000 in placing its wires under ground in the main parts of the cities.

NEW LEXINGTON, O.—The Perry County Telephone Company is preparing to rebuild its plant at this place. At a recent meeting of the board of directors it was decided to expend about $8,000 on the plant.

BELVIDERE, Ill.—A meeting of the stockholders of the Belvidere Telephone Company will be held November 4 to consider the question of issuing bonds to provide means to rebuild the company's exchange.

SPENCERVILLE, O.—The directors of the Spencerville Telephone company at a recent meeting declared a semi-annual dividend of 5 per cent. The company will begin the construction of new country lines at once.

CLEVELAND, O.—Reports of the Cuyahoga Telephone Company for September show the earnings of the company to have been the largest in its history, with those for the current month likely to be in excess of them.

UNIONVILLE, Mo.—The Kirksville Telephone Company will move into new quarters at the beginning of the year. In the meantime the company contemplates the expenditure of from $12,000 to $14,000 in the improvement of its system.

MINNEAPOLIS, Minn.—The directors of the Twin City Telephone Company have declared the fourteenth quarterly dividend on the preferred stock of the company, at the rate of 7 per cent per annum, payable November 1, 1905.

CELAYA, Mex.—The Celaya Telephone Company has increased its capital stock from $2,500 to $10,000. The company will establish an exchange at Irapuato. Jorge Herbert and Luis Iziabaga are among those interested in the enterprise.

LOGAN, Pa.—The Logan Citizens' Telephone Company recently held its quarterly meeting in this place. The regular quarterly dividend of 2 per cent was paid the stockholders. Secretary F. L. Van Gorder reported the company to be in good condition, receipts showing an increase over the previous quarter, and much new business having been secured.

ZANESVILLE, O.—At a special meeting of the stockholders of the Zanesville Telephone & Telegraph Company it was voted to expend $50,000 in improvements during the next year, which will include the extension of its underground system. The contemplated improvements will increase the capacity of the plant to accommodate from 1,000 to 1,300 more subscribers.

MARION, Ind.—A franchise has been prepared to be presented to the city council at its next meeting for the telephone company recently formed to install an exchange in this city and extend long distance lines to all surrounding cities and towns. The company includes members of the Delaware and Madison Counties Telephone Company, the Winchester Telephone Company, the Fort Wayne Telephone Company and other Independent companies. The estimated cost of the plant is $300,000.

CHIHUAHUA, Mex.—The Chihuahua Telephone Company has obtained an extension of its franchise in the city and state of Chihuahua for a period of twenty-five years, and it is stated the company will make important improvements and extensions of its system.

OAKLAND, CAL.—William Thomas, representing the Home Telephone Company of Alameda county, has filed application with the council for a franchise to construct and operate a telephone system in this city, and bids for the franchise will be received by the city clerk until December 4.

YORK, Pa.—At a recent meeting the stockholders of the York Telephone Company decided to increase the capital stock of the company from $200,000 to $500,000 for the purpose of placing the wires of the company under ground, making important rural extensions and adding general improvements.

## PERSONAL MENTION

STAMFORD, Conn.—Charles H. Borden of this city has invented a telephone holder.

IRONTON, O.—Harry Howe has been appointed manager of the Home Telephone Company of this place.

INDIANAPOLIS, Ind.—C. E. Stinson of the Toledo Home Telephone Company has been appointed consulting engineer for the New Long Distance Telephone Company and the Indianapolis Telephone Company.

THOMASVILLE, Ga.—S. P. Sanchez has been granted permission to establish a telephone service in Thomasville.

MANSVILLE, I. T.—H. S. Mulkey has been granted a 20-year franchise for a telephone exchange in Mansville.

NEW LEXINGTON, O.—Hosmer Jeffers has been appointed general manager of the Perry County Telephone Company.

NEW HARTFORD, Ia.—Sprague and Paulger have succeeded Sprague and Bowen in the telephone business at this place.

AYLMER, Ont.—Dr. Kingston of Aylmer will supervise the construction of rural telephone lines from Port Bruce to Port Burwell.

FAIRFAX, Minn.—Roy Stevens has been appointed manager of the Fairfax Telephone Company, to succeed S. W. Smith, resigned.

STERLING, Ill.—Thomas Sargent of Peoria has been appointed manager of the Interstate Telephone Company's plant in this city.

TITUSVILLE, Fla.—G. L. Mandaville has been granted a twenty year franchise for the operation of a telephone system in this city.

BEDIAS, TEX.—M. Templeman, who recently purchased the telephone system at this place, is giving the same a thorough overhauling.

COLUMBUS, Ga.—James L. Reed of Columbus, O., has been appointed general manager of the Automatic Telephone Company in this city.

DOYLESTOWN, Pa.—J. C. Preban, representing the Consolidated Telephone Company of Pennsylvania, has applied for a franchise in this city.

STREATOR, Ill.—T. C. Ainsworth has been appointed manager of the Streator Independent Telephone Company and will take charge of same on the 15th inst.

CUMBERLAND, Wis.—E. V. Benjamin has purchased the exchange of the Cumberland Telephone Company at this place and will make improvements and extensions.

LE MARS, Ia.—I. S. Mahan has resigned as secretary and manager of the Plymouth County Telephone Company and will be succeeded by O. L. Laudenslager.

WARREN, Minn.—Hans Swanson of this city is interested in the establishment of a telephone system in the village of Oslo and is arranging for the installation of the same.

ALVIN, Tex.—Mr. C. O. Lorenz has just completed the construction of a private telephone line between Alvin and Chocolate Bayou, which gives Alvin a complete telephone system.

HASTINGS, Neb.—Dr. J. W. Straight has tendered his resignation as manager of the Hastings Independent Telephone Company, the same to take effect as soon as his successor is chosen.

LEWISTON, Idaho—J. E. McGillivray has closed a contract with the Lewiston-Sweetwater Irrigation Company for the construction of about 16 miles of telephone lines for the company.

CLARENCE, Mo.—W. W. Tracy has sold his interest in the local telephone system to W. E. Naylor. Mr. Tracy has purchased the Shelbina telephone exchange and will take possession January 1.

NAPINKA, Man.—Messrs. Menarey and Estlin of the Melita-Arthur Telephone Company have presented a proposition to the town council to install a telephone system, and to construct a long distance line to connect with Mileta.

TERRE HAUTE, Ind.—Frank A. Kelley, as administrator of the estate of James Frank Holland, who was killed by a fall from a telephone pole, filed suit against the Citizens' Telephone Company for $5,000 damages, which has been adjusted for a consideration of $475.

MILWAUKEE, Wis.—Henry M. Walsh, a St. Louis attorney, has been in the city recently in connection with a new telephone proposition. Mr. Walsh will make arrangements to have a franchise ordinance introduced, making the fifth party asking franchise in this city.

CHICAGO, Ill.—F. L. Huey advises he has a small telephone system in Missouri for sale. Good territory. Splendid opening for practical man. Present owners cannot give telephone business any attention. The system cost $4,000, but will sell for $2,500. Prospective buyers address F. L. Huey, care Telephony Publishing Company, Chicago.

DETROIT, Mich.—Mr. Alexander M. Copeland of Detroit has had on exhibition in this city the Poulsen telegraphone, an instrument for registering telephone messages, said to be the invention of a Danish scientist. The few in existence are made abroad, but a company is being formed in the East to manufacture them in this country. It is proposed to rent them in the same manner as telephones.

ALBUQUERQUE, N. M.—A. C. Nash, general manager of the street railway system of Chihuahua, Mex., has purchased the Chihuahua Telephone Company's plant and all property from the M. S. Otero estate, Dr. George W. Harrison, Gross, Kelly & Co., and Governor M. A. Otero, for a consideration of $45,000. The telephone system has been in operation at Chihuahua since 1882, and has always paid a dividend on the money invested.

MARION, Ind.—O. L. Barger of Converse, Ind., who is interested in the company recently formed to establish an Independent telephone system in this city, states if the franchise asked for is granted the company will at once begin work on the system and will have the plant in operation by September next. To show its good

faith the company proposes to execute a bond in the sum of $1,000 to have the plant in operation within the time limit.

TECUMSEH, Neb.—Otto Wettstein, Jr., of La Porte City, Iowa, is interested in the organization of an Independent telephone company in Tecumseh. His plan is to place as much of the stock as possible with Tecumseh capitalists and Geneva parties will take the remainder. A franchise has already been secured and all that remains to be done is to interest a sufficient number of citizens. This action has been brought about by the poor service given by the operating company.

LEWISTON, Me.—Elmer Dacy, superintendent of the Lewiston-Auburn Automatic Telephone Company, appeared before the Auburn city government recently and asked that the company be released from an indemnity bond of $50,000, which was furnished at the time it was setting its poles and laying its conduits to secure the city against loss by damage suits in case of accident. The city government refused to release the bond, although the company now has $287,000 worth of property in Lewiston and Auburn.

MILBANK, S. D.—Superintendent Temple of the Grant County Telephone Company is being besieged in every direction to extend the lines before winter sets in, and he is bending every effort to make as many connections and as rapidly as possible. At present work is being pushed on the main line between Milbank and Albee and Revillo. The towns and country to the north, east, northeast and southwest have all been connected. About 300 telephones have already been installed and the number could be doubled if the weather would permit and proper crews could be obtained. The company hopes to reach one thousand subscribers within the coming year. The system bids fair to be a good paying investment.

BEAUMONT, TEX.—C. C. Conroy, president of the Northwestern Telephone Company, is about to institute proceedings looking to the recovery of possession of the Beaumont Northwestern Telephone Company, an Independent line, having sixteen exchanges in the towns of east Texas and 500 miles of wire. The company's plant was leased to the Lone Star Telephone Company about a year ago. The Lone Star Company defaulted in its payment to the company and some time ago J. W. Mackey of this city was named as receiver for all properties of the Beaumont company in the hands of the Lone Star company. It is Mr. Conroy's intention to recover the plant if possible and operate it as an Independent concern. Ample financial backing will be assured and provision made for improving the plant.

## UNDER-GROUND CONSTRUCTION

ST. JOSEPH, Mich.—The Twin City Telephone Company will place its wires underground in this city.

ATLANTA, Ga.—The council committee on electric lights has approved the petition of the Atlanta Telephone & Telegraph Company for the right to place underground conduits in certain parts of the city.

SYRACUSE, N. Y.—The Independent Telephone Company is pushing the work of laying its new subways in the downtown district and the company hopes to have its new switchboard in operation by January 1.

BUFFALO, N. Y.—Two and a quarter miles of conduits will be installed throughout the city at an estimated cost of $40,000. It is probable that the Home Telephone Company and the Inter-Ocean Telephone Company will join in its construction.

TERRE HAUTE, Ind.—The Citizens' Telephone Company has submitted plans showing proposed extension of its conduit system which, if accepted, will eliminate many of the overhead wires of the company. Contract for making the improvements will be filed within a short time.

QUINCY, Ill.—The work of installing the Independent telephone system by the Home Automatic Telephone Company of this city has begun. The plant will cost $500,000. R. S. Spencer, Charles Sutter and J. H. Murphy, all of St. Louis, are among the principal stockholders. McMeen & Miller, Monadnock Block, Chicago, have the contract for the underground work. Herman & Schatzman of St. Louis are handling the securities of the company.

STREATOR, Ill.—At a recent meeting of the city council the Streator Independent Telephone Company filed a bond of $1,000 for a permit to put in new underground cable conduits. About $12,000 will be spent in putting in new cable, and when this work is completed and the company has moved into its new office it will have a capacity of three thousand telephones in this city. As soon as the company is installed in its new quarters a vigorous campaign will be made for additional subscribers.

## REORGANIZATIONS

NEW MILFORD, Ill.—F. E. Pell and Arthur Chase are reorganizing an Independent telephone company in this place. The company will have a capital stock of $5,000 and it is the intention to have an exchange of about 100 telephones. The system will cover the greater part of New Milford, Cherry Valley and a part of Ogle county.

DETROIT, Mich.—The new Home Telephone Company has been reorganized and the nominal capital stock of $10,000 named in the first articles of incorporation, has been increased to $5,000,000. Those interested in the new company have purchased a controlling interest in the Peninsular Telephone Company, the toll line company organized in connection with the Co-operative Telephone Company, and capitalized at $100,000. This ownership is said to make the new company independent of the Co-operative company for entrance into Detroit, and it also insures connection with the Independent telephone companies throughout the state as the Peninsular Telephone Company has eight toll lines leading from Detroit to Monroe, Lansing and Grand Rapids, and is building three more to Flint and Saginaw.

## LEGAL ITEMS

OKLAHOMA CITY, Okla.—A petition has been filed in the circuit court asking for an order to prevent the Pioneer Telephone Company from raising its rates, and the order has been granted.

GROVANIA, Ga.—A suit has been entered against the Grovania Telephone Company in which certain original members of the company dispute the entrance right of new stockholders. It is alleged that stock has been sold without the consent of the members and said members are now demanding that the new stockholders be rejected and the new stock canceled.

SHERMAN, Tex.—An agreement has been reached in the condemnation proceedings of the North Texas Telephone Company against the T. & P. Railway, whereby the telephone company will have the use of the railroad right of way between Sherman and Whitesboro, which will enable the company to begin the construction of its line at once and push the same to completion.

## COMBINATIONS

CROOKSTON, MINN.—The local telephone system has been purchased by A. F. Cronquist.

BUFFALO, N. Y.—The Frontier Telephone Company of this place has purchased the Salamanca Telephone Company.

RUSH CITY, Minn.—The Minnesota Mutual Telephone exchange has been purchased by the Tri-State Telephone Company.

FT. MADISON, Ia.—The Mississippi Valley Telephone Company has purchased the Dallas City Telephone System, with several toll lines.

SNYDER, Okla.—The Snyder Telephone Company has purchased the interests of the Topeka & El Reno Telephone Company in Snyder.

BRIGHTON, IA.—The telephone exchange at this place formerly owned by G. W. Smith has been purchased by the Mutual Telephone Company.

LEROY, IA.—The LeRoy Telephone Company has purchased the exchange at Riceville formerly owned by the Northern Iowa Telephone Company.

ADA, Minn.—The Halstad Telephone Company is negotiating with the Norman County Telephone Company for the connection of the two systems.

BRYAN, O.—The Bryan Telephone Company of this place has purchased the plant of the Pioneer Telephone Company, which has about 100 telephones in service.

MOORHEAD, Minn.—The Northwestern Telephone Company has transferred its toll stations in the Red River Valley, adjacent to Fargo, to the Red River Telephone Company.

BROWNSTOWN, Ind.—The Brownstown Telephone Company has closed a deal with the Union Telephone Company, by which it has placed in service over sixty additional telephones.

PIERRE, S. D.—The local telephone exchange has been purchased by Messrs. Zeitlow and Bilkenhaupt, manager and secretary, respectively, of the company. Connections will be made with the Twin Cities.

OTTAWA, KANS.—Announcement is made of the sale to the Home Telephone Company of Kansas City, of a controlling interest in the Ottawa Telephone Company, the new owners to take possession December 1.

CASTLEDALE, Utah—The Eastern Utah Telephone Company, recently incorporated at Price, Utah, has purchased the Carbon and Emery County telephone line. The company will build 80 miles of line in Carbon county.

MANCHESTER, Ia.—The toll line of the Interstate Telephone Company extending from Dyersville to Hopkington, Delhi, Delaware, and Manchester, has been taken over by the Delaware County Telephone Company of this city.

EAST AURORA, N. Y.—The Inter-Ocean Telephone Company has purchased the Elma and Parilla exchanges, which will be managed by the local branch of the Inter-Ocean company, known as the East Aurora Telephone Company.

LONG BEACH, Cal.—The exchanges at Long Beach, Ventura,

Santa Ana, San Pedro, San Bernardino, Colton, Anaheim, Fullerton and Orange have been consolidated into one company known as the Consolidated Telephone Company, which will develop the territory.

SOUTH MCALESTER, I. T.—The Pioneer Telephone Company, with headquarters at Oklahoma City, has purchased the exchange of the South McAlester-Eufaula Telephone Company, which also includes the exchanges in the smaller mining towns of the mining district.

ERSKINE, Minn.—A deal has been closed whereby the local telephone system which has been owned for some time by a local stock company has been purchased by A. F. Cronquist, a banker of this city. Mr. Cronquist will greatly improve the system and will also make extensions.

BOWLING GREEN, O.—The Home Telephone Company of North Baltimore has been absorbed by the Wood County Telephone Company of this city. The plant has been formally turned over to the new owners, who will overhaul the system and make a canvass to obtain new business.

COLUMBUS, Ind.—The Citizens' Telephone Company of this place has closed a deal whereby it has gained possession of the Hope Independent Telephone Exchange at Hope, Ind., for $28,000. The Citizens' company is negotiating for several other independent exchanges in this vicinity.

WELLSBORO, Pa.—The Farmers' Mutual Telephone Company of Wellsboro and the Citizens' Mutual Telephone Company of Mansfield have been combined. The two companies have long worked together and now operate over 2,000 telephones in all directions in the counties of Tioga, Potter and Bradford.

CASEY, Ill.—The Shimel Telephone Company has absorbed the Lafferty and Fitch telephone systems. The former consists of fifty city telephones and eight hundred farmers' telephones. Mr. Fitch sold his Greenup exchange to Dr. Fisher and the Shimel Company bought his city and country line from this place to Greenup.

TERRE HAUTE, Ind.—The St. Louis and Toledo capitalists who have purchased stock in the Citizens' Telephone Company of this city recently met for the purpose of reorganizing the company, and completed the final details. The company will now be put in first class condition, as there is ample capital back of the enterprise.

NASHUA, Ia.—Since the Corn Belt Telephone Company has taken charge of the exchange at this place there have been many improvements in the service. About forty telephones have been installed during the past month and a number more are to be installed. C. W. Ayers is manager of the company's exchange at this place.

CARMICHAELS, Pa.—Uniontown capitalists, headed by J. V. Thompson, have purchased the rights of the Carmichael Telephone Company. The acquisition of this property is considered quite a victory for the Independents in this section owing to the fact that the Bell company recently succeeded in purchasing the property and rights of the South Bend Telephone & Telegraph Company.

SALT LAKE CITY, Utah.—At a recent meeting of the stockholders of the Kraft-Nickum Combination Telephone Company the proposition to take over the shares of the company by the International Combination Telephone Company of Los Angeles, Cal., was adopted. The general offices of this company will hereafter be located at Los Angeles, and the factory may also be located there. The company is backed by men of wealth and enterprise.

SYRACUSE, N. Y.—The Independent Telephone Company of this city has absorbed the Syracuse Telephone Company and is operating under the latter's charter. The Independent company is now engaged in placing about 2,000 telephone poles in the streets of the city and effort is being made to compel the company to place its wires underground. A temporary injunction has been granted by Justice Andrews restraining work above ground until the matter is decided by the courts.

WATERLOO, Ia.—A deal has been consummated whereby the Corn Belt Telephone Company, with headquarters in this city, assumes control of the Buchanan county system, which includes the exchanges at Independence, Aurora and Lamont and about fifteen other important toll stations. The system also includes more than 100 miles of toll lines in the county and all the farmers' lines, which are probably more numerous in Buchanan county than in any other county in the state. The Corn Belt company will make many improvements in the system and thoroughly develop it.

CAPE GIRARDEAU, Mo.—Under the name of the Kennett and Caruthersville Telephone Company, W. G. Petty and J. B. Blakemore, of Kennett; Judge Hina C. Schultz, of Caruthersville; J. E. Franklin, of Fredericktown, and John A. Hope, of Cape Girardeau, have purchased the lines of the Cape Girardeau Telephone Company in Dunklin and Pemiscot counties. This includes the line from Campbell to Caruthersville, the exchanges at Kennett, Caruthersville and Hayti and toll lines. The new company will install a full metallic circuit throughout the entire system and make all other improvements necessary to first-class service.

TERRE HAUTE, Ind.—The Citizens' Telephone Company of this city has passed to the control of the Kinloch interests, which have purchased 55 per cent of the stock. It is understood that the capital stock will be increased to $375,000, and ultimately to $750,000. The new capital will be spent in improvements; $100,000 at once, and $250,000 in all, as speedily as it can be used to advantage. Plans are being prepared for the construction of an exchange building. The Terre Haute parties who founded the company several years ago, nearly all retain stock in the new organization. The officers of the company are as follows: President, C. M. Forster, who is also president of the Kinloch company, St. Louis; vice-president, W. P. Ijams, formerly president of the Citizens' company, this city; secretary-treasurer, Roy McCanne, who is also secretary of the Kinloch company; general manager, G. L. Hutchinson.

## MISCELLANEOUS

WINDSOR, O.—The citizens of this place are planning a local telephone system.

GUILFORD, Ill.—The question of telephone service for Guilford is being agitated.

SEELEY, N. J.—An effort is being made to establish telephone service in this place.

OWINGSVILLE, KY.—The Owingsville and Preston telephone lines will be discontinued.

MELBY, Minn.—The question of a telephone exchange at this place is being agitated.

LEROY, MINN.—The LeRoy Telephone Company has purchased the exchange at Richville, Ia.

ROCKFORD, Ill.—The Home Telephone Company of this city has about 500 names on its waiting list.

COLUMBIA, S. C.—The Gibbes Machinery Company contemplates installing an inter-communicating telephone system.

HENDERSON, NEB.—The York County Telephone Company is erecting a new office and supply house at this place.

ALBERT LEA, MINN.—The Tri-State Telephone Company will erect an exchange building for its use at this place.

LONDON, Eng.—Telephone communication has been established between London and Rome, a distance of 1,100 miles.

PARKERBURG, Ia.—The exchange of the Corn Belt Telephone Company at this place was recently destroyed by fire.

MINOT, N. D.—The Northern Telephone Company has been granted permission to establish long distance service at Minot.

EMBARRASS, WIS.—The Matteson Telephone Company will install a new switchboard and make a general overhauling of its plant.

PRENTICE, Wis.—The organization of a new telephone company is being considered for the installation of a local telephone system.

NASHVILLE, ILL.—The Elkhorn and Stone Church Progressive Telephone Company has completed its line and has same in operation.

MILWAUKEE, Wis.—Telephone service at 2 cents a call is proposed by one of the telephone companies seeking a franchise in this city.

RIVERSIDE, Cal.—The Home Telephone Company will add 500 additional telephones to its system, making a total of 1,600 instruments in service.

FRIENDSHIP, Tenn.—A sufficient number of subscribers have been secured to establish a telephone exchange in this place, and the same is being installed.

THOMASTON, Ala.—Business men of this place are interested in a proposed telephone line connecting this city and Selma, Myrtlewood, Linden and Consul.

DILLON, Mont.—The report of the first month's business done by the Southern Montana Telephone Company shows very satisfactory returns on the investment.

BANGOR, Pa.—The Slate Belt Telephone Company has just completed the installation of a new exchange in this city, which is one of the finest in this section of the state.

SPRINGFIELD, Tenn.—The Home Telephone Company is making an effort to secure an entrance to Springfield, but is being opposed by the Cumberland Telephone Company.

SIOUX FALLS, S. D.—The South Dakota Central Railroad Company has received a large shipment of telephone equipment and will at once establish a system for its own use.

WINONA, Minn.—The physicians of Winona have unanimously decided to patronize the Home Telephone Company, and accordingly have ordered the Northwestern company to remove its instruments from their offices.

LYNNVILLE, TENN.—Representatives of the Long Distance Telephone & Telegraph Company have been in this vicinity, securing rights of way and making general investigations with a view to establishing an exchange.

SILVERTON, Ore.—The Independent telephone companies of Silverton, Woodburn, Hubbard, Aurora, Cany and Maxburg are making an effort to organize a state association, and recently held a meeting with that object in view.

LONE OAK, Tex.—The Citizens' Telephone Company, having exchanges at Lone Oak, Point and Emery, has 400 telephones in operation and is still growing, 75 telephones and a new switchboard having been added recently.

SPRINGFIELD, Ill.—The Egan Electric and Telephone Company of Petersburg has appealed to the Springfield Business Men's Association, asking that they receive some encouragement from the local association with a view to permanently locating in this city. The

company was recently organized to manufacture a newly patented telephone.

BIRMINGHAM, Ala.—The People's Telephone Company's exchange at this place has been destroyed by fire.

MONRAVIA, Cal.—Dr. Hughes of Los Angeles has purchased the Independent Telephone Company at this place.

MT. SUNAPEE, N. H.—The Barton Brothers of Corydon are negotiating for the purchase of the local telephone system.

PETERSBURG, Va.—The Petersburg Telephone Company has let contract to Keeler & Sons for the erection of a telephone exchange building, to cost $10,000.

GENEVA, Neb.—A delegation of business men from Tecumseh recently inspected the Independent telephone plant in this city with a view to installing an Independent system in their own city.

GREEN BAY, Wis.—The Fox River Telephone & Telegraph Company has about completed its long distance line, connecting Green Bay and Appleton, via Kaukauna. The company will at once install a new exchange in Kaukauna.

MONROE, Wis.—A movement is on foot by those who are protesting against the raise in rates, to organize a mutual telephone company. Subscribers are asked to take $500 in stock and almost one hundred subscribers have been secured.

LOS ANGELES, Cal.—The Home Trust Company, formed two years ago for the protection of the Home Telephone Company, has been dissolved, its usefulness having ceased with the issuance of the new bonds by the telephone company.

NEW BEDFORD, Pa.—The citizens of this place are making an effort to organize an Independent telephone company to affiliate with the Citizens' Telephone Company, doing business in Sharon, New Castle and other Pennsylvania cities.

COLORADO SPRINGS, Colo.—The stockholders of the El Paso Telephone Company recently held a meeting in this city and elected William Innis as secretary and Fred Willoughby, J. H. Ridenour, C. H. Watson, William Innis and H. Ellithorpe, directors.

MANKATO, Minn.—The Rapidan and Mankato Telephone Company has recently doubled its number of subscribers. This company claims to have the best service of any farmers' line in the state. Fred O. True is president of the company, and C. C. Johnson, secretary.

DETROIT, Mich.—Inventions for the improvement of telephone service, which are claimed to be of special benefit to telephone users, have been completed in this city and patents obtained. The inventor is F. C. Osborn and the patents are now controlled by J. D. Spitzer, also of this city.

MARION, O.—The Marion County Telephone Exchange has recently installed a new switchboard to meet the demands of its rapidly increasing rural subscription service. There are now about 1,750 subscribers in the city, while the country service furnishes several hundred more.

ST. LOUIS, Mo.—Representatives of six of the largest Independent telephone companies in the United States recently held a conference in this city. The object of the meeting was to improve the service of the several companies by establishing closer relations between the companies interested.

CARLINVILLE, Ill.—The managers of the Macoupin County Telephone Company have signed a contract with the Kinloch company whereby they may connect their lines with the latter company. The local company has heretofore been greatly hampered by not having the long-distance connections which it desired.

COLORADO SPRINGS, Colo.—By the terms of an agreement recently filed with the county clerk, the Home Telephone Company has purchased all of the property, poles, wires, cables, franchises, etc., formerly owned by the El Paso Telephone Company, but taken in under a chattel mortgage by R. M. Handy and C. D. Pickett.

ST. JOSEPH, Mo.—At a mass meeting held recently under the auspices of the Retail Merchants' Association resolutions were adopted advocating action on the part of the commercial bodies of the city which will give the exclusive support of the members of the business associations to the Citizens' Telephone Company.

BREMERTON, Wash.—Under directions from the war department the equipment department of the Puget Sound navy yard has been conducting experiments in Bremerton with the wireless telephone, and recently the first message was sent from Seattle to the yard. The tests are being made with a view to making use of the instruments.

CHARLESTOWN, Md.—The United Telephone and Telegraph Company, which recently began rebuilding its lines and making extensive improvements in this town, has been stopped by the city council on the ground that the company's franchise does not grant the privilege of rebuilding. The company will probably have to secure a new franchise.

SIOUX CITY, Ia.—The Iowa Telephone Company has been officially notified that the contract whereby it agreed to supply telephone service for the county buildings expired October 31. This is the end of the hard fought battle between the Automatic Telephone Company and the Iowa company, which has resulted in a victory for the former.

CHIPPEWA FALLS, Wis.—The various farmers unions of Chippewa County are agitating the matter of telephone facilities in their various communities. A proposition will be made the Chippewa County Telephone Company, with headquarters at Eagle Point, to place a telephone in every farm house in the county at a rate of $12 per year instead of $18 as now charged. In the event of the company's failure to respond to the demand to such rate, the farmers will organize a company for the purpose of installing a co-operative system. The following are some of the towns interested: Eagle Point, Anson, Lafayette.

RIVERSIDE, Cal.—A party of Los Angeles capitalists recently made a tour of inspection of the local plant of the Home Telephone Company with a view to purchasing a controlling interest in the same. The local plant is valued at $225,000. About forty miles of line is now in use, with 1,200 telephones in operation and 500 more to be installed immediately.

WOODSVILLE, N. H.—Representatives of the Independent telephone companies of Vermont and New Hampshire met in Woodsville the 2d inst. for the purpose of forming an organization to be known as the Vermont and New Hampshire Independent Telephone Association. The purpose of the association is to promote uniformity of operation, maintenance and construction and to secure co-operation among the Independent interests.

NASHVILLE, Tenn.—In accordance with a state requirement the following telephone companies operating in Tennessee have submitted reports of instruments and equipment to the comptroller: Weakley County Telephone Company, of Dresden, 245 instruments; Stantonville Telephone Company, 180; Newport Telephone Company, 104; Greeneville Telephone Company, 129; Bristol Telephone Company, 808; Citizens' Telephone Company, of McMinnville, 172.

AUSTIN, Tex.—Judge J. E. Boynton and J. B. Earle of Waco, representatives of the South Texas Telephone Company, recently incorporated with a capital stock of $400,000, are making arrangements for the establishment of the company's headquarters in this city. It is the intention of the promoters of the new company to begin operations as soon as possible. The new company will operate in about fifty of the leading counties in the central and southern part of the state. Frank Smith of San Antonio will be manager of the company.

YANKTON, S. D.—The Independent Telephone Company of Yankton has commenced construction work on the extension of long distance lines from Gayville to Sioux City, connecting with the lines of the New State Telephone Company and the Sioux City Telephone Company's new exchange. When these connections are completed the Independent telephone system of South Dakota will cover the greater part of the south half of the state, with a total investment of $250,000, owned by the following companies: Yankton Telephone Company, Missouri River Telephone Company of Geddes and the Citizens' Telephone Company of Sioux Falls.

MILWAUKEE, Wis.—The Badger Telephone & Telegraph Company, which owns 200 miles of pole line and 650 miles of wire in the state, is anxious for an Independent Company to secure a franchise in this city. The Badger Company was formed to build and operate toll lines between the Independent exchanges in the state. The company's lines have reached Racine and will be extended to this city as soon as an Independent exchange is established here. Right-of-way has been secured for a toll line from Madison to La Crosse, which will be built in the spring. It is the intention of the company to reach the Wisconsin River Valley within the year.

TORREON, Mex.—This city is to be made the central point for an extensive system of long distance telephone lines, which are to cover a large portion of northern Mexico. The concession for the proposed system was obtained from the Mexican government about three years ago by John Woessner, an American resident of Saltillo. Mr. Woessner has already built long distance lines from Torreon to Gomez, Palacio, Lerdo and Durango, and at present has under consideration the extension of the system to Monterey, a distance of about 200 miles. Negotiations are now pending to obtain an entrance into Monterey, and if same are consummated the work of construction will begin at once.

WASHINGTON, D. C.—Consul Mahin of Nottingham reports that the British General Electric Company has devised a telephone instrument which has been rendered perfectly sanitary by simply abolishing the mouthpiece. The receiving and transmitting apparatus is combined in a small metal case, shaped like a watch, which is held continuously to the ear both in speaking and listening, the transmitting microphone being so sensitive that it becomes unnecessary to concentrate the sound waves on it by the aid of any mouthpiece, such as is ordinarily used. The new arrangement, mounted on a handle, with speaking key, is similar to the common combined transmitter, with the exception of the mouthpiece.

WASHINGTON, D. C.—The Daily Consular and Trade Reports of October 23 contains an interesting report furnished by Special Agent Burrill on opportunities existing in China for the introduction of electrical machinery and supplies of every description. This vast field seems to have been almost entirely overlooked by those engaged in this business. Mr. Burrill states that China has enjoyed less development along this line than any other country of its size in the world and presents a field which has offered and will continue to present great possibilities for our home engineers and manufacturers if they will attack the proposition with the same energy and business ability that characterize their operations in the United States. Foreign firms are on the ground, but are poorly equipped to handle the business.

# IN THE RURAL LINE DISTRICTS

A new line of telephone wire has been connected from Mt. Solon to Staunton.—*Staunton (Va.) Argus.*

We expect to have a new telephone line on our streets in the near future.—*West Hamlin (Mich.) Items.*

Hobart is diligently trying to get two telephone systems in operation.—*Hobart Correspondent in Michigan City Times-Journal.*

The telephone company came down from your city last week and are putting in the posts rapidly, and we will soon have an exchange. —*Mackville Items in Harrodsburg (Ky.) Democrat.*

The telephone gang, consisting of white bosses and "dago" workers, is working on the new long-distance line through here this week.—*Duchtown Correspondent in Ilion (N. Y.) Citizen.*

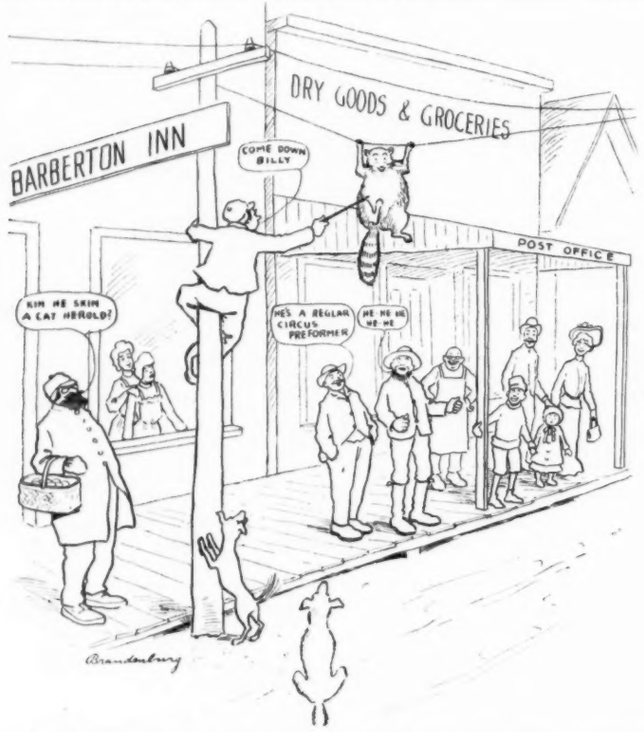
A telephone will soon be placed in this burg, which will fill a long-felt want, as we will then have direct communication with the outside.—*Special Correspondence in Algona (Wis.) Record.*

A man from Sassamansville, Montgomery county, was here investigating, with a view to building a telephone line between this place and Barto. If enough stocks can be secured along the line, the erection will begin at once.—*Reading (Pa.) Eagle.*

The Anadarko telephone system of 233 telephones has so run down that only eight plugs are not "dead," and if eight instruments are in use when a subscriber rings, all central can do is to wait and tremble while the subscriber spikes the transmitter with expletives. —*Anadarko Notes in Wichita (Kas.) Eagle.*

Dewar will soon have another telephone line. Wm. Clough, Wm. Schmitt, Wm. Turner and Wm. Reidel are building a line from Clough's to Dewar. The old saying is "Where there's a will there's a way." In this case there are four "Wills" and we are confident that they have a way. The line will extend three and one-half miles southeast of here, and is nearly completed. The four Wills are of our enterprising farmers and possibly they will extend the line to Jessup in the near future.—*Dewar Doings in Waterloo (Iowa) Reporter.*

Herold Vaughn purchased a young coon yesterday for two dollars. Last evening it escaped, evaded its pursuers, and sought refuge on the telephone wires on Tuscarawas avenue, in front of the Barberton Inn, where it proceeded to perform a number of feats,




to the enjoyment of a large crowd which had gathered. Coaxing was of no avail, and at a late hour the animal was still holding his high position.—*Barberton Correspondent in Akron (Ohio) Democrat.*

The telephone crew was in town again over Sunday. They were working back to Fargo, stringing wires. Burt Ash, the imposing drum major of the First Regiment band, had joined the

force at Lisbon. Reports come from up the line that people are driving many miles to see Burt climb telephone poles.—*Sheldon (N. D.) Progress.*

The Hanson Telephone Co. had a meeting in the Jackson school house last Friday evening for the purpose of selling more shares, but the majority of the members seemed to be of the opinion that the line was heavy enough without loading it with "Sand."—*Wisel Creek Correspondent, Preston (Minn.) Times.*

Herman Dake, a lineman employed by the Corn Belt Telephone Co., fell from a tree near Ed Madigan's residence, while engaged in stringing a wire. He fell about twenty feet, and broke a rib, cut his cheek, and otherwise injured himself, when he struck the ground. —*Clarksville Notes in Cedar Rapids (Ia.) Republican.*

The Home Telephone Co. has finally done the right thing, by remodeling the office. They have put up an iron partition, so that the person on business and the loafer will be treated alike. This move will be greatly appreciated by the patrons, as well as the "hello" girls.—*Darlington Items in Crawfordsville (Ind.) Journal.*

"Make your head save your legs" is an old maxim. The telephone is one of the greatest instrumentalities of modern civilization as a convenience-maker and time-saver; by it, the head saves the legs and lots of time and worry. But for the building of the Independent system, this enormous development of telephones in Indiana never would have been had.—*Greensburg (Ind.) Review.*

The members of the Farmers' Choice telephone line were up bright and early this morning, setting poles, taking their line from the Pleasant Grove poles and putting it upon their own. At the rate they started out, they will be talking over their own new line before this item is printed.—*Rural Correspondent in Canton (Ill.) Register.*

The United Telephone and Telegraph Co. is rebuilding its lines and rewiring the same with eight new wires through this place. There are two squads of young men at work. They have been making headquarters here for about two weeks. They have been gentlemanly and pleasant to associate with.—*Newry News in Altoona (Pa.) Tribune.*

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# Telephony.

VOLUME X.
NUMBER 6.

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Truly yours,
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New companies would do well to adopt CHICAGO apparatus at the beginning.

Yours very respectfully.
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And
Bentley Kansas

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Very truly yours,
Burrton-Inman Telephone Co.

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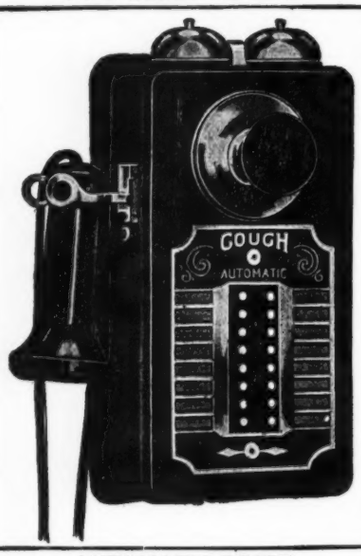


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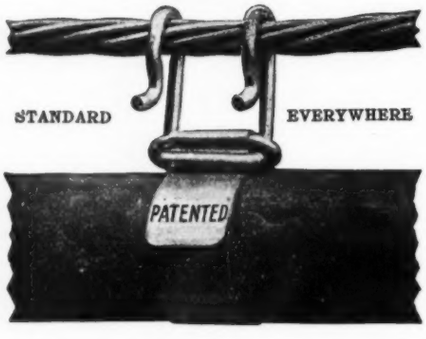


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Elkhart, Ind.

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Fifteen of these tele phones are now in their fifth year of service, and, aside from the modern improvements that have appeared on later telephones as you have kept abreast of the times, our old ones are equal to any on the system.

The switch board we have is, of course, what is now called old style, but it is astonishing how little trouble it gives us.

Very Respectfully Yours,
S. T. Pollard Mgr.
Banner Telephone Co.

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Nelson, Nebraska.

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We cordially trust this may impress some exchanges who are not so fortunate, and we shall be very glad to write to them.

Yours truly,
Wm. M. Reubelt Gen. Mgr.
Nuckolls County Independent Tel. Co.

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Yours very truly,
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D. Odell Mgr.

LOCAL AND LONG DISTANCE AUTOMATIC EXCHANGES

The Union Telephone Company
(Limited)

Florenceville, N. B.

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Gentlemen:

Some five years ago we purchased from you a number of long distance bridging telephones, and during this entire period there has never been one cent's worth of repairs required on these instruments, notwithstanding they have been in active service every minute of the time.

We have them on lines with instruments of other manufacture, and all the others have required more or less repairing - some of them a considerable amount. We have found your telephones to be good ringers and to transmit with perfect clearness and that they are ever reliable.

I need not say that a very important consideration with us is the fact that your telephones have needed no repairs, where others have required attention of all sorts and at all times; and this will be better appreciated when it is understood that we frequently send a man 150 miles to repair or replace something that should not have needed it, which means a big addition to our operating expenses.

The last order for twenty-five telephones was for the new line we have just built.

Yours truly,
The Union Telephone Co., Ltd.
H. H. Noll, Secy.

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Illinois Electric Co., Chicago, Ill.
**Brass and Copper.**
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**Cabinets, Filing.**
Railway Commercial Cabinet & File Co., Chicago, Ill.
**Cables.**
American Electrical Works, Phillipsdale, R. I.
Commercial Elec. & Sup. Co., St. Louis, Mo.
Electric Appliance Co., Chicago, Ill.
Indiana Rubber & Insulated Wire Co., Jonesboro, Ind.
New York Insulated Wire Co., New York, N. Y.
Okonite Company, New York, N. Y.
Runzel-Lenz Elec. Mfg. Co., Chicago, Ill.
Standard Underground Cable Co., Pittsburg, Pa.
Stromberg-Carlson Tel. Mfg. Co., Rochester, N. Y.
**Calculagraphs.**
Calculagraph Co., New York, N. Y.
**Call Registers.**
Baird Mfg. Co., Chicago, Ill.
**Clamps, Ground.**
Blackburn, Geo., Cleveland, Ohio.
Yonkers Specialty Co., Yonkers, N. Y.
**Climbers.**
Blakeslee Forging Co., Plantsville, Conn.
Klein & Sons, Mathias, Chicago, Ill.
**Clips, Cable.**
Chase-Shawmut Co., Newburyport, Mass.
**Coils, Induction.**
American Electric Telephone Co., Chicago, Ill.
Central Tel. & Elec. Co., St. Louis, Mo.
Dean Electric Co., Elyria, O.
Standard Telo. & Elec. Co., Milwaukee, Wis.
**Conduit, Underground.**
American Conduit Co., Chicago, Ill.
Camp Co., The H. B., New York, N. Y.
McRoy Clay Works, Brazil, Ind.
**Connectors.**
American Electric Fuse Co., Muskegon, Mich.
Chicago Brass Co., Chicago, Ill.
Fahnestock Electric Co., Brooklyn, N. Y.
Fahnestock Transmitter Co., Brooklyn, N. Y.
Yonkers Specialty Co., Yonkers, N. Y.
**Contractors.**
Crumb & Co., W. H., Chicago, Ill.
General Engineering Co., Chicago, Ill.
Jones & Winter, Chicago, Ill.
Miller & McMeen, Chicago, Ill.
**Condensers, Telephone.**
Andrae & Sons Co., Julius, Milwaukee, Wis.
Dean Elec. Co., Elyria, O.
Electric Appliance Co., Chicago, Ill.
Standard Telo. & Elec. Co., Milwaukee, Wis.
Williams-Abbott Electric Co., Cleveland, O.
**Cords.**
American Electrical Works, Phillipsdale, R. I.
Premier Electric Co., Chicago, Ill.
Runzel-Lenz Elec. Mfg. Co., Chicago, Ill.
**Counters.**
Baird Mfg. Co., Chicago, Ill.
Veeder Manufacturing Co., Hartford, Conn.
**Cross Arms and Pins.**
American Elec. Supply Co., Chicago, Ill.
Austin & Co., M. B., Chicago, Ill.
Central Electric Co., Chicago, Ill.
Central Tel. & Elec. Co., St. Louis, Mo.
Commercial Elec. Sup. Co., St. Louis, Mo.
Dearborn Electric Co., Chicago, Ill.
Doubleday-Hill Elec. Co., Pittsburg, Pa.
Electric Appliance Co., Chicago, Ill.
Ewing-Merkle Electric Co., St. Louis, Mo.
Farr Tel. & Con. Sup. Co., Chicago, Ill.
Guarantee Telo. & Equip. Co., Chicago, Ill.
Illinois Electric Co., Chicago, Ill.
Nagel Electric Co., W. G., Toledo, Ohio.
**Directory. Telephone.**
Mail Order Mfg. Co., Chicago, Ill.
**Drop Forgings.**
Blakeslee Forging Co., Plantsville, Conn.
**Enamel Signs.**
Burdick Enamel Sign Co., Chicago, Ill.
Enameled Steel Sign Co., Chicago, Ill.
**Engravers.**
Pontiac Eng. & Pub. Co., Chicago, Ill.
**Engineers, Construction.**
Baumfleck & Schramm, Chicago, Ill.
Crumb & Co., W. H., Chicago, Ill.
General Engineering Co., Chicago, Ill.
Guarantee Telo. & Equip. Co., Chicago, Ill.
Jones & Winter, Chicago, Ill.
McMeen & Miller, Chicago, Ill.
**Furniture, Steel.**
Andrews Co., A. H., Chicago, Ill.
Chicago Wire Chair Co., Chicago, Ill.
**Generators, Telephone.**
American Electric Telephone Co., Chicago, Ill.
Chicago Telephone Supply Co., Elkhart, Ind.
Dean Electric Co., Elyria, Ohio.
Eureka Electric Co., Genoa, Ill.
Fisk-Newhall Telo. Mfg. Co., Chicago, Ill.
Monarch Telephone Mfg. Co., Chicago, Ill.
Stromberg-Carlson Tel. Mfg. Co. Chicago, Ill.
Williams-Abbott Electric Co., Cleveland, O.
**Generator Winder.**
Fisk-Newhall Telo. Mfg. Co., Chicago, Ill.
**Generators, Ringing.**
Current Elec. Co., Chicago, Ill.
Long Distance Telo. Sales Co., Chicago, Ill.
Sandwich Pole Changer Co., Sandwich, Ill.
Viaduct Mfg. Co., Baltimore, Md.
Warner Electric Co., Muncie, Ind.
**Guy Clamps.**
Cook, F. B., Chicago, Ill.
**Hangers, Cable.**
American Electric Fuse Co., Muskegon, Mich.
Bissell Co., The F., Toledo, O.
Central Electric Co., Chicago, Ill.
Chase-Shawmut Co., Newburyport, Mass.
Cook, F. B., Chicago, Ill.
National Telo. Supply Co., Cleveland, O.
Standard Underground Cable Co., Pittsburg, Pa.
**Instruments, Measuring.**
Commercial Elec. Sup. Co., St. Louis, Mo.
Guarantee Telo. & Equip. Co., Chicago, Ill.
Leeds & Northrop Co., Philadelphia, Pa.
Machado & Roller, New York, N. Y.
Simplex Co., Newark, N. J.
Weston Electrical Instrument Co., Newark, N. J.
Whitney Electrical Instrument Co., New York, N. Y.
**Insulating Material.**
Delaware Hard Fibre Co., Wilmington, Del.
New York Insulated Wire Co., New York, N. Y.
Standard Underground Cable Co., Pittsburg, Pa.
**Insulators, China and Porcelain.**
American Electric Fuse Co., Muskegon, Mich.
Central Electric Co., Chicago, Ill.
Electric Appliance Co., Chicago, Ill.
Nagel Electric Co., W. G., Toledo, Ohio.
**Insulators, Glass.**
Hemingray Glass Co., Covington, Ky.
**Investment Brokers.**
Farnsworth, Bills & Co., Chicago, Ill.
**Iron, Norway.**
Blakeslee Forging Co., Plantsville, Conn.
Nash & Co., Geo., Chicago.
Stevens Co., Chas. G., Chicago.
**Lamps, Switchboard.**
American Electric Telephone Co., Chicago, Ill.
Dean Elec. Co., Elyria, O.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Rochester, N. Y.
**Material, Construction.**
American Elec. Supply Co., Chicago, Ill.
Andrae & Sons Co., Julius, Milwaukee, Wis.
Austin & Co., M. B., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Cadiz Electric Co., Cadiz, O.
Central Electric Co., Chicago, Ill.
Central Tel. & Elec. Co., St. Louis, Mo.
Chicago Telephone Supply Co., Elkhart, Ind.
Commercial Elec. Supply Co., St. Louis, Mo.
Cook, F. B., Chicago, Ill.
Couch Co., S. H., Boston, Mass.
Dearborn Electric Co., Chicago, Ill.
Doubleday-Hill Elec. Co., Pittsburg, Pa.
Electric Appliance Co., Chicago, Ill.
Ewing-Merkle Electric Co., St. Louis, Mo.
Farr Tel. & Con. Supply Co., Chicago, Ill.
Guarantee Telo. & Equip. Co., Chicago, Ill.
Fisk-Newhall Telo. Mfg. Co., Chicago, Ill.
Illinois Electric Co., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.
Kusel Tel. Mfg. Co., D. A., St. Louis, Mo.
Mountain State Elec. Co., Wheeling, W. Va.
Nagel Electric Co., W. G., Toledo, Ohio.
Standard Telo. & Elec. Co., Milwaukee, Wis.
Sterling Electric Co., Lafayette, Ind.
Swedish-American Tel. Co., Chicago, Ill.
United Telephone & Elec. Co., Orrville, O.
Viaduct Mfg. Co., Baltimore, Md.
Western Telephone Mfg. Co., Chicago, Ill.
Williams-Abbott Electric Co., Cleveland, O.
Williams Telephone & Supply Co., Cleveland O.
**Meters.**
American Electric Telephone Co., Chicago, Ill.
**Miniature Lamps.**
Sunbeam Incandescent Lamp Co., Chicago, Ill.
**Motor Cycles.**
Armac Motor Co., Chicago, Ill.
Reading Standard Cycle Co., Reading Pa.
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Crowe Name Plate & Engraving Co., Chicago Ill.
**Nippers and Pliers.**
Klein & Sons, Mathias, Chicago.
**Ohmmeters.**
Bissell Co., F., Toledo, Ohio.
Machado & Roller, New York, N. Y.
Whitney Electrical Inst. Co., New York N. Y.
**Operator's Chairs.**
Andrews Co., A. H., Chicago, Ill.
Electric Appliance Co., Chicago, Ill.
Richards Chair Panel Co., Chicago, Ill.
**Pay Stations.**
Baird Manufacturing Co., Chicago, Ill.
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Crosselmire & Ackor Co., Newark, N. J.
**Poles, Cedar.**
Beidler & Co., Francis, Chicago, Ill.
Bissell Co., The F., Toledo, O.
Brooks Co., Hall L., Tomahawk, Wis.
Duluth Log Company, Duluth, Minn.
Fowler & Co., John H., Chicago, Ill.
Humbird Lumber Co., Sand Point, Idaho.
Minneapolis Cedar & Lbr. Co., Minneapolis, Minn.
Mueller Co., William, Chicago, Ill.
Naugle Tie Co., E. E., Chicago, Ill.
Pacific Coast Pole Co., Spokane, Wash.

Partridge Lbr. Co., T. M., Minneapolis, Minn.
Pendleton & Gilkey, Minneapolis, Minn.
Pittsburg & Lake Superior Iron Co., Escanaba, Mich.
Raber & Watson, Chicago, Ill.
Sterling & Son, W. C., Monroe, Mich.
Vogel & Co., Herman, Clark Fork, Idaho.
Whitmore, A. E., Minneapolis, Minn.
Wittenberg Cedar Co., Wittenberg, Wis.
Worcester Co., C. H., Chicago, Ill.

**Poles, Chestnut.**
Wilson & Co., Jas. I. M., Pittsburg, Pa.

**Pole Changers.**
Current Elec. Co., Chicago, Ill.
Sandwich Pole Changer Co., Sandwich, Ill.
Warner Electric Co., Muncie, Ind.

**Protectors, Telephone.**
American Electric Fuse Co., Muskegon, Mich.
American Electric Telephone Co., Chicago, Ill.
Central Tel. & Elec. Co., St. Louis, Mo.
Century Tel. Construction Co., Buffalo, N. Y.
Chicago Telephone Supply Co., Elkhart, Ind.
Commercial Elec. Supply Co., St. Louis, Mo.
Cook, F. B., Chicago, Ill.
Eureka Electric Co., Genoa, Ill.
Lyon Metallic Mfg. Co., Chicago, Ill.
Sterling Electric Co., Lafayette, Ind.
Tornquist Elec. Mfg. Co. Davenport, Ia.
Williams-Abbott Electric Co., Cleveland, O.

**Receiver Cases.**
General Insulate & Mch.Co., Brooklyn, N. Y.
Scranton Button Co., Scranton, Pa.

**Purchasing Agents.**
Cox & Co., A. J., Chicago.

**Receivers, Telephone.**
Guarantee Telo. & Equip. Co., Chicago, Ill.
Illinois Specialty Mfg. Co., Chicago, Ill.
Murdock, W. J., Chelsea, Mass.
Viaduct Mfg. Co., Baltimore, Md.

**Reels, Ready Pay Out.**
Nagel Electric Co., W. G., Toledo, Ohio.

**Seals, Incorporation.**
Middleton & Co., J. W., Chicago, Ill.

**Signs, Telephone.**
Burdick Enamel Sign Co., Chicago, Ill.
Enameled Steel Sign Co., Chicago, Ill.
Stroud, Harold D., St. Louis, Mo.

**Solder, Self-Fluxing.**
Belden Manufacturing Co., Chicago, Ill.

**Specialties, Telephone.**
Baird Mfg. Co., Chicago, Ill.
Veeder Mfg. Co., Hartford, Conn.

**Staples, Insulated.**
Blake Signal & Mfg. Co., Boston, Mass.

**Steel, Magnet.**
Nash & Co., Geo., Chicago, Ill.
Stevens Co., Chas. W., Chicago, Ill.

**Supplies, Telephone.**
American Electric Fuse Co., Muskegon, Mich.
American Elec. Supply Co., Chicago, Ill.
American Electric Telephone Co., Chicago, Ill.
Andrae & Sons Co., Julius, Milwaukee, Wis.
Baird Mfg. Co., Chicago, Ill.
Bissell Co., F., Toledo, O.
Cadiz Electric Co., Cadiz, O.
Central Electric Co., Chicago, Ill.
Central Tel. & Elec. Co., St. Louis, Mo.
Chase-Shawmut Co., Newburyport, Mass.
Chicago Telephone Supply Co., Elkhart, Ind.
Commercial Elec. Sup. Co., St. Louis, Mo.
Cook, F. B., Chicago, Ill.
Couch Co., S. H., Boston, Mass.
Dean Electric Co., Elyria, Ohio.
Dearborn Electric Co., Chicago, Ill.
Doubleday-Hill Elec. Co., Pittsburg, Pa.
Electric Appliance Co., Chicago, Ill.
Eureka Electric Co., Genoa, Ill.
Ewing-Merkle Electric Co., St. Louis, Mo.
Farr Tel. & Con. Supply Co., Chicago, Ill.
Illinois Electric Co., Chicago, Ill.
Kusel Telo. Mfg. Co., D. A., St. Louis, Mo.
Manhattan Electric Supply Co., Chicago, Ill.
Mountain State Elec. Co., Wheeling, W. Va.
Nagel Electric Co., W. G., Toledo, Ohio.
North Electric Co., Cleveland, Ohio.
Standard Telo. & Elec. Co., Milwaukee, Wis.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Rochester, N. Y.
Swedish-American Telephone Co., Chicago, Ill.
Viaduct Mfg. Co., Baltimore, Md.
Western Telo. Mfg. Co., Chicago, Ill.
Williams-Abbott Electric Co., Cleveland, O.
Williams Telephone & Supply Co., Cleveland, O.

**Switches, Knife.**
Tornquist Elec. Mfg. Co., Davenport, Ia.

**Switchboards, Automatic Telephone.**
Automatic Electric Co., Chicago, Ill.
Chicago Telephone Supply Co., Elkhart, Ind.
Globe Automatic Telo. Co., Chicago.

**Switchboards, Common Battery.**
American Electric Telephone Co., Chicago, Ill.
Century Tel. Construction Co., Buffalo, N. Y.
Chicago Telephone Supply Co., Elkhart, Ind.
Dean Electric Co., Elyria, Ohio.
International Telephone Mfg. Co., Chicago, Ill.
North Electric Co., Cleveland, Ohio.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Rochester, N. Y.
Western Telo. Mfg. Co., Chicago, Ill.
Williams-Abbott Electric Co., Cleveland, O.

**Switchboards, Magneto.**
American Electric Telephone Co., Chicago.
Andrae & Sons Co., Julius, Milwaukee, Wis.
Baird Mfg. Co., Chicago, Ill.
Cadiz Electric Co., Cadiz, O.
Central Tel. & Elec. Co., St. Louis, Mo.
Century Tel. Construction Co., Buffalo, N. Y.
Chicago Telephone Supply Co., Elkhart, Ind.
Dean Electric Co., Elyria, Ohio.
Electric Appliance Co., Chicago, Ill.
Eureka Electric Co., Genoa, Ill.
Farr Tel. & Con. Supply Co., Chicago, Ill.
Fisk-Newhall Telo. Mfg. Co., Chicago, Ill.
Guarantee Telo. & Equipment Co., Chicago, Ill.
International Telephone Mfg. Co., Chicago, Ill.
Keystone Electric Telephone Co., Pittsburg, Pa.
Long Distance Telo. Sales Co., Chicago, Ill.
Monarch Telephone Mfg. Co., Chicago.
North Electric Co., Cleveland, Ohio.
Standard Tel. & Elec. Co., Milwaukee, Wis.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Rochester, N. Y.
Swedish-American Telephone Co., Chicago, Ill.
United Telephone & Elec. Co., Orrville, O.
Western Telephone Mfg. Co., Chicago, Ill.
Williams-Abbott Electric Co., Cleveland, O.
Williams Telephone & Supply Co., Cleveland, O.

**Tape.**
New York Insulated Wire Co., New York, N. Y.
Standard Underground Cable Co., Pittsburg, Pa.

**Telephones, Adjustable.**
American Electric Telephone Co., Chicago.

**Telephones, Automatic.**
Automatic Electric Co., Chicago, Ill.
Chicago Telephone Supply Co., Elkhart, Ind.
Globe Automatic Telo. Co., Chicago.

**Telephones, Common Battery.**
American Electric Telephone Co., Chicago, Ill.
Century Tel. Construction Co., Buffalo, N. Y.
Chicago Telephone Supply Co., Elkhart, Ind.
Chicago Writing Machine Co., Chicago, Ill.
Dean Electric Co., Elyria, Ohio.
International Telephone Mfg. Co., Chicago, Ill.
Long Distance Telo. Sales Co., Chicago, Ill.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Rochester, N. Y.
United Telephone & Elec. Co., Orrville, O.
Williams-Abbott Electric Co., Cleveland, O.
Western Telo. Mfg. Co., Chicago, Ill.

**Telephone Directories.**
Patent Telo. Directory Co., Chicago, Ill.

**Telephones, Intercommunicating.**
Couch Co., S. H., Boston, Mass.

**Telephones, Lock Out.**
Austin & Co., M. B., Chicago, Ill.
Baird Mfg. Co., Chicago, Ill.

**Telephones, Magneto.**
American Electric Telephone Co., Chicago, Ill.
Andrae & Sons Co., Julius, Milwaukee, Wis.
Baird Mfg. Co., Chicago, Ill.
Cadiz Electric Co., Cadiz, O.
Central Electric Co., Chicago, Ill.
Central Tel. & Elec. Co., St. Louis, Mo.
Century Tel. Construction Co., Buffalo, N. Y.
Chicago Telephone Supply Co., Elkhart, Ind.
Chicago Writing Machine Co., Chicago, Ill.
Commercial Elec. Supply Co., St. Louis, Mo.
Couch Co., S. H., Boston, Mass.
Dean Electric Co., Elyria, Ohio.
Dearborn Electric Co., Chicago, Ill.
Doubleday-Hill Elec. Co., Pittsburg, Pa.
Electric Appliance Co., Chicago, Ill.
Eureka Electric Co., Genoa, Ill.
Ewing-Merkle Electric Co., St. Louis, Mo.
Fisk-Newhall Telo. Mfg. Co., Chicago, Ill.
Guarantee Telo. & Equipment Co., Chicago, Ill.
Illinois Electric Co., Chicago, Ill.
International Telephone Mfg. Co., Chicago, Ill.
Keystone Electric Telephone Co., Pittsburg, Pa.
Kusel Telo. Mfg. Co., D. A., St. Louis, Mo.
Long Distance Telo. Sales Co., Chicago, Ill.
Monarch Telephone Mfg. Co., Chicago.
Mountain State Elec. Co., Wheeling, W. Va.
Nagel Electric Co., W. G., Toledo, Ohio.
North Electric Co., Cleveland, Ohio.
Standard Telo. & Elec. Co., Milwaukee, Wis.
Sterling Electric Co., Lafayette, Ind.
Stromberg-Carlson Tel. Mfg. Co., Rochester, N. Y.
Swedish-American Telephone Co., Chicago, Ill.
United Telephone & Elec. Co., Orrville, O.
Viaduct Mfg. Co., Baltimore, Md.
Western Telephone Mfg. Co., Chicago, Ill.
Williams-Abbott Electric Co., Cleveland, O.
Williams Telephone & Supply Co., Cleveland, O.

**Telephone Parts.**
American Electric Telephone Co., Chicago, Ill.
Andrae & Sons Co., Julius, Milwaukee, Wis.
Austin & Co., M. B., Chicago, Ill.
Cadiz Electric Co., Cadiz, O.
Chicago Telephone Supply Co., Elkhart, Ind.
Couch Co., S. H., Boston, Mass.
Dean Electric Co., Elyria, Ohio.
Dearborn Electric Co., Chicago, Ill.
Long Distance Telo. Sales Co., Chicago, Ill.
Manhattan Electric Supply Co., Chicago, Ill.
Monarch Telephone Mfg. Co., Chicago, Ill.
North Electric Co., Cleveland, Ohio.
Standard Tel. & Elec. Co., Milwaukee, Wis.
Sterling Electric Co., Lafayette, Ind.
Swedish-American Telephone Co., Chicago.
Western Telo. Mfg. Co., Chicago, Ill.
Williams-Abbott Electric Co., Cleveland, O.
Williams Telephone & Supply Co., Cleveland, O.

**Telephones, Second Hand.**
Guarantee Telo. & Equipment Co., Chicago, Ill.

**Testing Clips.**
Frankel Display Fixture Co., New York, N. Y.

**Terminals, Cable.**
Cook, F. B., Chicago, Ill.
Guarantee Telo. & Equip. Co., Chicago, Ill.

**Time Stamps.**
Baird Mfg. Co., Chicago, Ill.
Calculagraph Co., New York, N. Y.

**Tools, Construction.**
Bissell Co., The F., Toledo, Ohio.
Channon Company, H., Chicago, Ill.
Klein & Sons, Mathias, Chicago, Ill.

**Tools, Linemen's.**
Klein & Sons, Mathias, Chicago, Ill.

**Torches, Blow.**
Emmelmann Bros. Mfg. Co., Indianapolis, Ind.
Turner Brass Works, Chicago, Ill.

**Universal Cord Joint.**
Austin & Co., M. B., Chicago, Ill.

**Voltmeters.**
Guarantee Telo. & Equip. Co., Chicago, Ill.
Illinois Electric Co., Chicago, Ill.
Leeds & Northrop Co., Philadelphia, Pa.
Simplex Co., Newark, N. J.
Weston Electrical Instrument Co., Newark, N. J.

**Wire, Copper.**
American Electrical Works, Phillipsdale, R. I.
Manhattan Electric Supply Co., Chicago, Ill.
Plume & Atwood Mfg. Co., Chicago, Ill.
Roebling & Sons Co., John A., Trenton, N. J.
Scovill Mfg. Co., Chicago, Ill.
Standard Underground Cable Co., Pittsburg, Pa.

**Wire, Galvanized Iron.**
Chicago Telephone Supply Co., Elkhart, Ind.
Crawfordsville Wire & Nail Co., Crawfordsville, Ind.
Doubleday-Hill Elec. Co., Pittsburg, Pa.
Indiana Steel & Wire Co., Muncie, Ind.
Manhattan Electric Supply Co., Chicago, Ill.
Roebling's Sons Co., John A., Trenton, N. J.

**Wire, Rubber Covered.**
Austin & Co., M. B., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Dearborn Electric Co., Chicago, Ill.
Indiana Rubber & Insulated Wire Co., Jonesboro, Ind.
New York Insulated Wire Co., New York, N. Y.
Okonite Company, New York, N. Y.
Standard Underground & Cable Co., Pittsburg, Pa.

**Wire, Magnet.**
Belden Manufacturing Co., Chicago, Ill.
Standard Underground & Cable Co., Pittsburg, Pa.

**Wire, Strand.**
Austin & Co., M. B., Chicago, Ill.
Crawfordsville Wire & Nail Co., Crawfordsville, Ind.
Roebling's Sons Co., John A., Trenton, N. J.
Standard Underground & Cable Co., Pittsburg, Pa.

**Wire, Telephone Switchboard.**
Belden Manufacturing Co., Chicago, Ill.
Premier Electric Co., Chicago, Ill.
Runzel-Lenz Elec. Mfg. Co., Chicago, Ill.

**Wire, Weatherproof.**
Austin & Co., M. B., Chicago, Ill.
Bissell Co., The F., Toledo, O.
Central Electric Co., Chicago, Ill.
Dearborn Electric Co., Chicago, Ill.
Doubleday-Hill Elec. Co., Pittsburg, Pa.
Nagel Electric Co., W. G., Toledo, Ohio.
New York Insulated Wire Co., New York, N. Y.
Standard Underground Cable Co., Pittsburg, Pa.

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American Electric Fuse Co., Muskegon, Mich.
Churchill Cabinet Co., Chicago, Ill.
Telephone Woodworking Co., Tiffin, Ohio.

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The next edition of TELEPHONY — that of January 1st, 1906 — will be an especially elaborate number on account of the Electrical Exposition to be held at the Coliseum, Chicago, January 15-27. TELEPHONY will have a booth at this show and every interested visitor will receive a sample copy of the publication. Send us that new advertising contract to start with our January issue.

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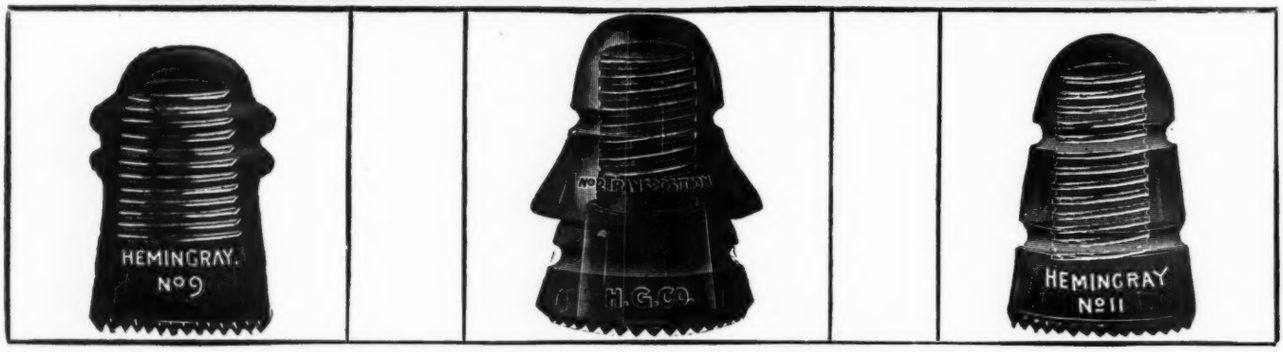
## ALL WITH THE "PATENT DRIP PETTICOATS."

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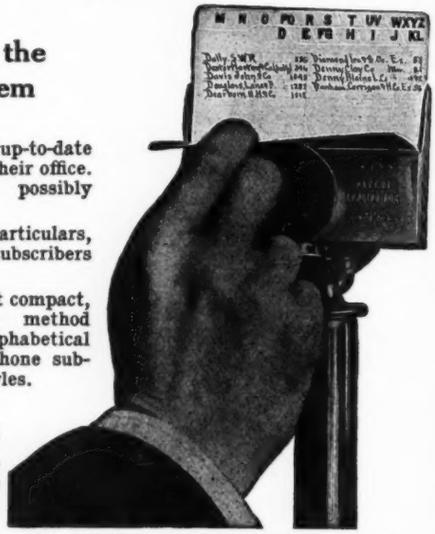

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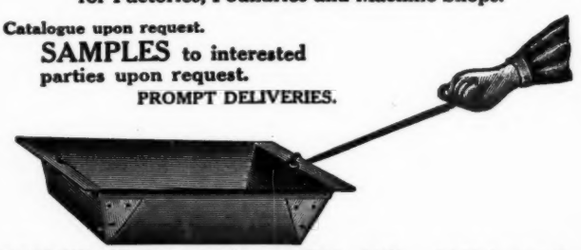

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with one of your plugs and we will equip the plug with a Universal Joint and 6 foot Cord, and return to you prepaid.

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By the use of this Joint you will have **No More Cord Troubles**

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Carried in Chicago stock in all colors. It is the best Interior Wire made.

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WE HANDLE BRIDGING AND SERIES TELEPHONES AND ALL KINDS OF SUPPLIES ALSO.

## American Electrical Supply Company

83-85-87 FIFTH AVE. :: :: :: :: CHICAGO

## INDEPENDENT TELEPHONE SIGNS

No. 1. Size 17x18.

**The Official Emblem Adopted by the National Interstate Telephone Association**

**Get them direct** from the manufacturer. These signs are enameled on 18 gauge steel, are made double faced with 1½-inch flange. We guarantee them never to fade or tarnish from the effects of the weather.

These signs are made in three colors. The shield is red, white and blue. Quantity governs our price. We are prepared to ship any quantity from 5 to 100 signs within three days notice. Send us the quantity of signs desired and we will quote you prices by return mail.

No. 2. Size 8x18.

## The Burdick Enamel Sign Co.

52 State Street, - - CHICAGO, ILL.

## A Clean and Complete Stock and a Satisfactory Way of Doing Business

These have Helped to Make Us Friends Amongst the Telephone Trade Everywhere.

High grade Telephones and a large line of Construction Materials and Supplies, including Cross Arms, Locust Pins, Oak Brackets, B. B. Galvanized Wire, Glass Insulators, Wire Connectors, Cross Arm Braces, Bolts, etc., etc., always carried in stock.

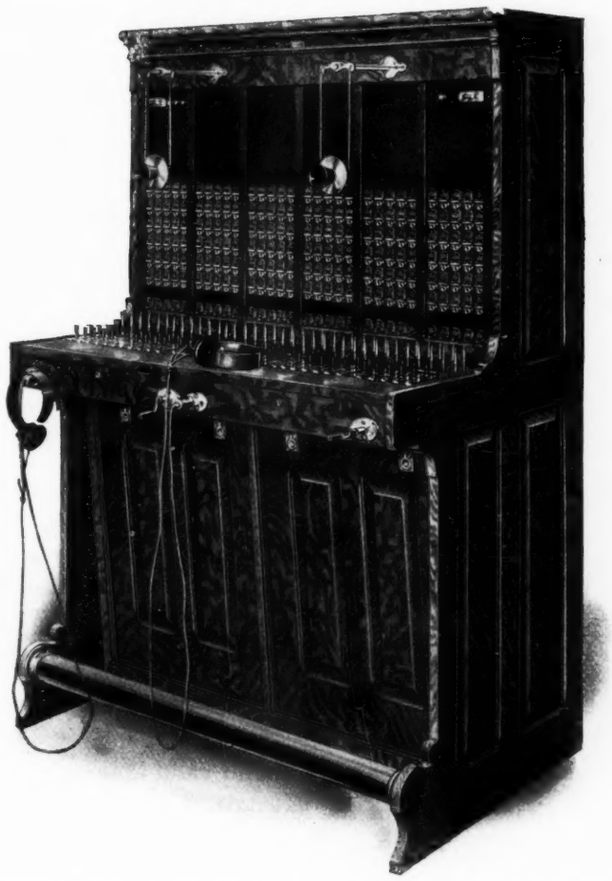
COURTEOUS TREATMENT
LOWEST PRICES
PROMPT DELIVERY

Not a mere matter of phraseology, but sober, dependable facts. Try us.

## DOUBLEDAY-HILL ELECTRIC CO. PITTSBURG, PA.

Please tell the Advertiser you saw his Announcement in TELEPHONY.

# DEAN TELEPHONE APPARATUS



Our self restoring drop switchboards are practically perfection not only in their operation but in their entire make-up—a representative Dean product.

The above illustration shows a two position cabinet with an ultimate capacity of three hundred lines, thirty lamp transfers and thirty cord circuits.

This apparatus is the cheapest to be had—everything considered.

## HARMONIC CONVERTER
### A MONEY MAKER

# THE DEAN ELECTRIC COMPANY
## ELYRIA · OHIO

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# IMPORTANT—Pole Changer Decision

## IN THE UNITED STATES CIRCUIT COURT, For the Northern District of Illinois, EASTERN DIVISION.

Abbot L. Johnson, *et al.*, (Warner Electric Co.)
Thomas W. Warner, *Complainants,*
vs.
Illinois Electric Specialty Company, *et al.*,
*Defendants.*

In Equity,
No. 26,986.

## DECREE, of November 6th, 1905.

Present: Christian C. Kohlsaat, Circuit Judge.

This cause came on to be heard on the 4th day of October, 1905, upon the pleadings and proofs, and was argued by counsel for the complainants, no counsel for defendants being present, and the pleadings and proofs having been duly considered, and the Court being sufficiently advised in the premises doth find for the complainants; and thereupon it was and is hereby ordered, adjudged and decreed:

That the complainants are the sole and exclusive owners of the re-issued Letters Patent No. 12,162, on an invention in Pole Changers, issued upon the application of William F. Warner, and dated October 13, 1903, as set forth in the Bill of Complainant; that the complainants are also the owners of the entire right to recover damages and profits from all infringers of said reissued Letters Patent; that the said reissued Letters Patent are good and valid in law, and that the said William F. Warner was the original and first inventor of the improvements described and claimed in the said re-issued Letters Patent; that the said reissued Letters Patent have been infringed by the defendants herein, by the manufacture, use and sale of Pole Changers embodying the invention or inventions defined in and by claims 1, 2, 9, 12, 15, 16, 17 and 18 thereof.

It is hereby further ordered, adjudged and decreed that the said defendants, the Illinois Electric Specialty Company, its officers, directors, stockholders, attorneys, employes, agents, servants and workmen, each and all of them, and all persons operating by, through or under the authority or direction of them, or any or either of them, be and are hereby restrained and enjoined for the remainder of the term of the life of said reissued Letters Patent No. 12,162 from further infringing the same, and from manufacturing, using or selling the said infringing Pole-Changers or any Pole-Changer or devices containing or embodying the invention or inventions embraced in said reissued Letters Patent as defined in and by the aforesaid claims 1, 2, 9, 12, 15, 16, 17 and 18 thereof, and that an injunction issue accordingly.

It is hereby further ordered, adjudged and decreed that the complainants recover from the said defendants as well as the damages sustained in or by reason of said infringement, as the profits, gain and saving made or realized by the defendants thereby, together with the costs herein, taxed and to be taxed, and that this cause be referred to Hervey W. Booth one of the Masters in Chancery of this Court, to take, state and report an account of damages and profits under and in accordance with

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this decree; and that the said defendants at the hearing before said Master shall appear for examination concerning the infringing manufacture, use and sale aforesaid, and shall produce, as they may be required, all their books, accounts, papers and memoranda relating thereto, or wherein any information concerning the same may have been kept or shall be found.

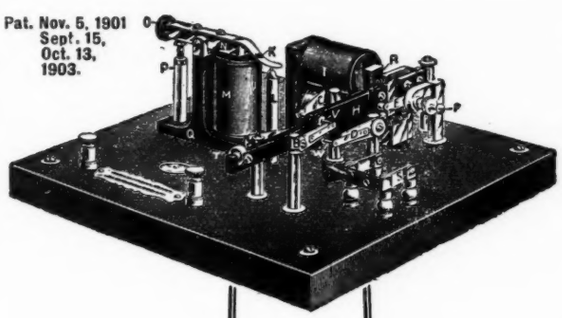
Chicago, Illinois,
November 6, 1905.
Northern District of Illinois } ss.
Eastern Division

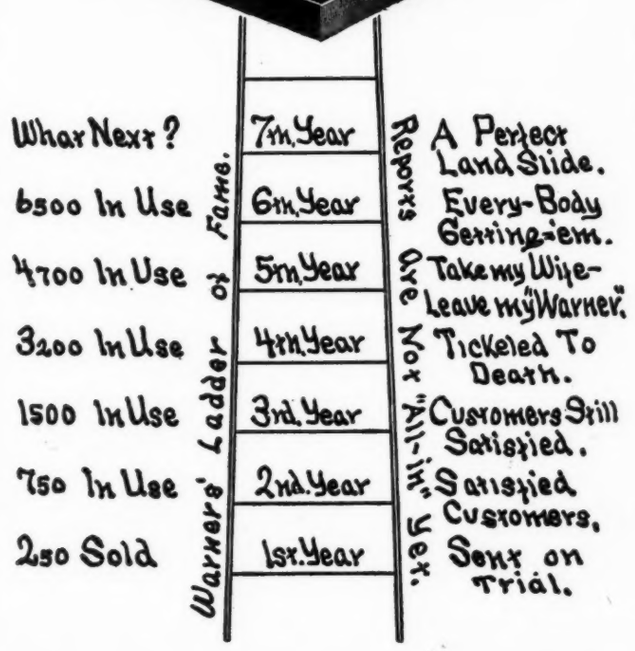
(Sgd.)
(KOHLSAAT)
Judge.

I, Marshall E. Sampsell, Clerk of the Circuit Court of the United States, for said Northern District of Illinois, do hereby certify that the above and foregoing to be a true and complete copy of the DECREE entered in said Court on the 6th day of November A. D. 1905, in the cause wherein Abbot L. Johnson et al are the Complainants and Illinois Electric Specialty Company et al are the Defendants, as the same appears from the original Files and record now remaining in my custody and control.

In testimony whereof, I have hereunto set my hand and affixed the seal of said Court, at my office in Chicago, in said District, this 7th day of November, A. D., 1905.

(SEAL) MARSHALL E. SAMPSELL, Clerk.


THE **WARNER** HAS REACHED THE TOP.

IN STRICTLY HIGH CLASS AND UP-TO-DATE RINGING OUTFITS.

The ascent has been made on MERIT and giving our customers the best of

**Satisfaction** WHICH WE **Guarantee**

**The U. S. Circuit Court Sustains the Validity of The Warner Electric Co. Pole Changer Patents and Issues an Injunction against the Manufacture, Sale and Use of the Illinois Pole Changer.**

**Warner Electric Co.**

Factories: MUNCIE, IND., U. S. A.; WINDSOR, ONT., CANADA.
General Offices: Muncie, Indiana, U. S. A.

# Cut-Down Your Expense

BY USING

## Okonite Wires and Cables

The man who installs OKONITE will save its cost in a comparatively short time. With OKONITE there is less "trouble shooting." It lasts longer and is more reliable than any other rubber covered wire on the market. The celebrated open-circuit Samson Batteries carried in Chicago Stock.

**Our Stock of Construction Material** is also complete, our prices attractive and you are assured of prompt shipment.

SEND US A TRIAL ORDER

**Central Electric Company**

**207-209-211 East Jackson Boulevard** **CHICAGO**

# IF WE HAVE THE TELEPHONE

**Best suited to your requirements; can ship from stock at an attractive price; you should send a trial order TO-DAY.**

**"SUMTER" QUALITY--"EVERBEST"**

**DELIVERY—30 DAY FREE TRIAL.**

## EWING-MERKLE ELECTRIC COMPANY

**ST. LOUIS. MISSOURI**

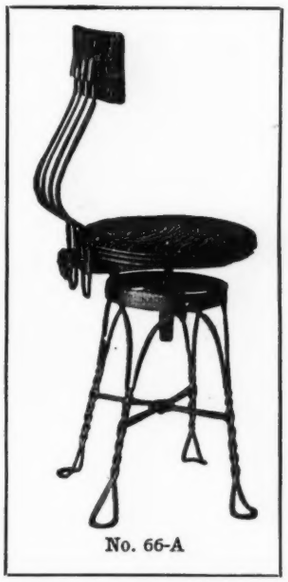
Please tell the Advertiser you saw his Announcement in TELEPHONY.

# A New Addition and a New Edition

The new addition is our No. 62 Chair and the new edition is the accompanying prices.

No. 62

No. 66



No. 66-A

This line of tempered Bessemer steel rod furniture is honestly made and has honest values.

We know this to be true and want to prove it to you if you will let us ship you a sample stool or chair.

Our spring and adjustable back may be moved in or out and the adjustment made permanent by a set screw. No other make has this feature. The height of the seat may also be regulated and the adjustment made permanent by the set screw, yet the seat can be revolved without altering the height. Our full line is here illustrated:

| No. 66 Stool—Two Heights. 24-28 inch; 28-32 inch. | | No. 66-A Chair—One Height. 18-24 inch. | | No. 62 Chair—One Height. 18-24 inch. | |
|---|---|---|---|---|---|
| Single Lots | $4.50 each | Single Lots | $4.25 each | Single Lots | $3.50 each |
| Lots 10 to 20 | 4.25 each | Lots 5 to 10 | 4.10 each | Lots 5 to 10 | 3.25 each |
| Lots 20 or more | 4.00 each | Lots 10 or more | 3.90 each | Lots 10 or more | 3.00 each |

THE ABOVE PRICES ARE F. O. B. CHICAGO.

THE WOODWORK IS FURNISHED IN EITHER OAK, OR BIRCH MAHOGANY FINISH, AS DESIRED.

## ELECTRIC APPLIANCE COMPANY

TELEPHONE MANUFACTURERS

CHICAGO SAN FRANCISCO

Please tell the Advertiser you saw his Announcement in TELEPHONY.

No. 75 M—Only $4.00
Chief operator or toll board chair

There is Sound Sense in the use of NEVER BREAK

# Andrews' Steel Rod Telephone Furniture

No. 78 M—Operator's Chair

It is convenient—comfortable and lasts a lifetime—impossible to injure it or wear it out—the leading telephone exchanges throughout the country are rapidly adopting this style of furniture and wherever it has been given a trial it has met with unqualified approval.

## Quality is the Best Policy

**There is quality in ANDREWS' STEEL ROD FURNITURE**

not to be found in the imitating kinds (for like all good things Andrews' Steel Rod Furniture is imitated). The metal part is handsomely and durably plated in Japanese Copper finish, the wood-work the best that experience and unequalled facilities can produce. This furniture appeals at sight to all practical telephone people.

No. 351 Table 30x48 inches.

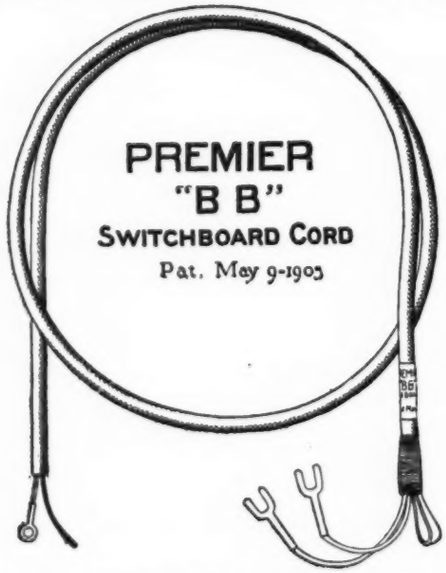
**All Telephone Companies should adopt our Steel Furniture for exclusive use.**

**Send for Metal Furniture Catalog.**

## A. H. Andrews & Co.

**174-176 Wabash Avenue :-: Chicago**

## Eliminates Cord Trouble




**REDUCES OPERATING EXPENSE.**
**Flexible, Substantial and Durable.**
**Write for Prices and Information.**

## Premier Electric Company,

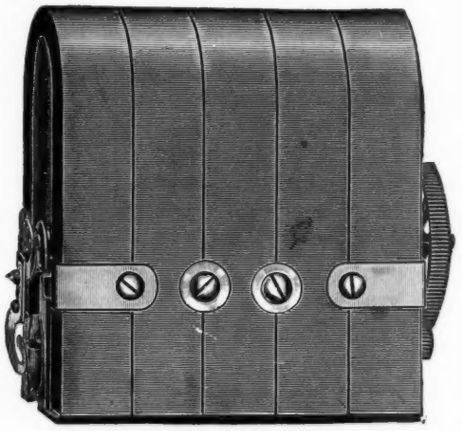
Sole Manufacturers. 118-132 W. Jackson Blvd., Chicago

## THE HIGH EFFICIENCY OF OUR GENERATOR

**is the result of our careful attention to details of design and construction.**

**Mechanically our solid brass cut gears, wide brass journals and dust proof armature case make a noiseless generator.**

**Electrically our long permanent high carbon steel magnets, soft laminated iron armatures and tight fitting pole pieces make a perfect magnetic circuit.**



**Perfect Parts Make Perfect Phones.**

**THE WILLIAMS TELEPHONE & SUPPLY CO.** 57 Central Ave. Cleveland, Ohio

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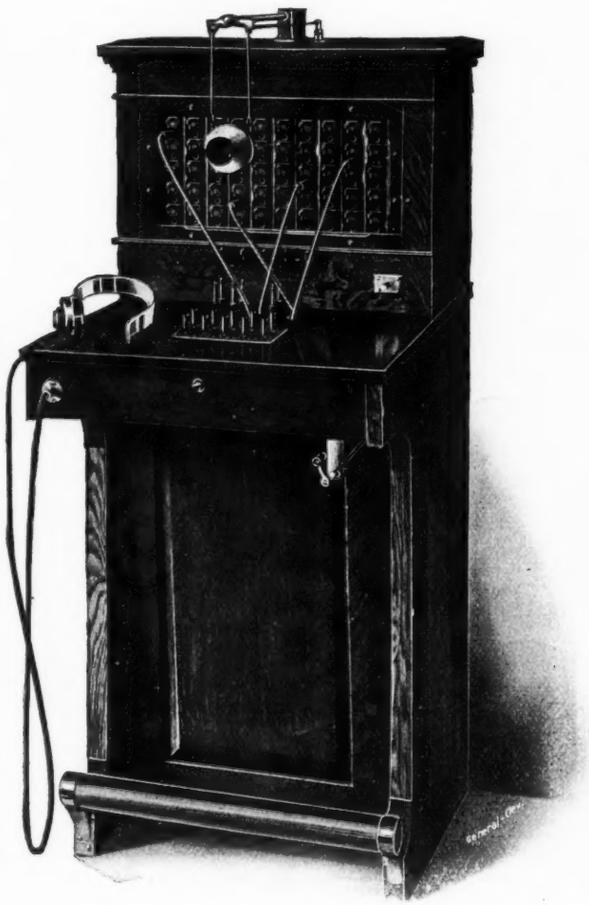


50 CAP. EXPRESS SWITCHBOARD FOR THE FEEDERS.

# Kwality Kounts

FIRST

# Price Next

WE CAN INTEREST YOU ON BOTH.
U CAN NEVER INCREASE

# Your Earnings

WITHOUT APPARATUS
Economical of Maintenance.

Are you familiar with our new line? NO!
Then write. New printed matter that describes.

# Apparatus For All Conditions

SAMPLES SENT ON APPROVAL

MAJESTIC DESK SET. MOST UP-TO-DATE. WHY?
LET US SHOW U.

THERE IS NOTHING IN THE TELEPHONE LINE
WE DON'T MAKE.

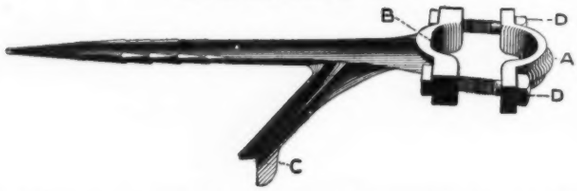
# WILLIAMS-ABBOTT ELECTRIC CO.

CLEVELAND, OHIO.

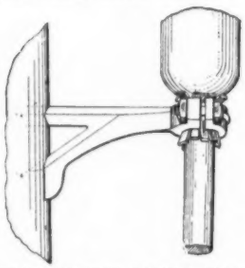
## Novelty Pot Heads

*do* cut out wiped joints and *do* save you money at forty per cent from list.

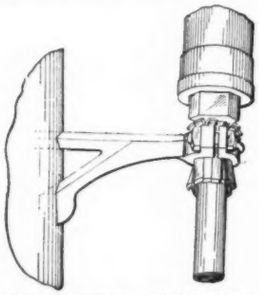
## Security Pothead Brackets




at sixty-five cents net each *are* cheaper than wooden blocks and they don't break down while the pole lasts. What does a wooden block cost you and how long does *it* last?



Bracket in Position, Old Style Pothead.



Bracket in Position, "Novelty" Pothead.

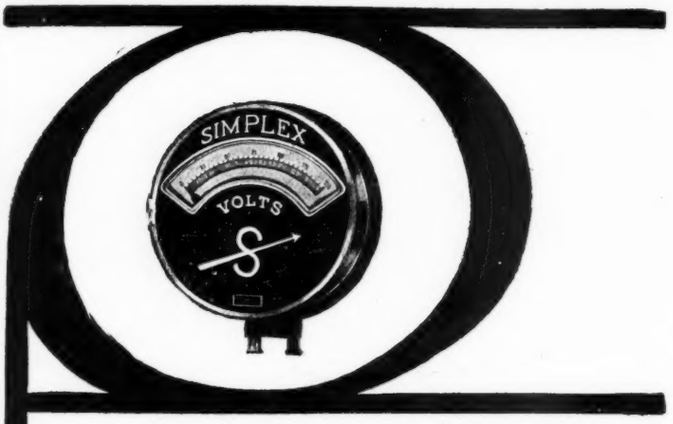
This is the way they look.

## Novelty Sleeve and Three-Way Branch

No wiped joints. Do it with a torch and soldering iron. Price forty per cent from list. Send for catalog 125.

**THE F. BISSELL COMPANY**
Manufacturers
TOLEDO, O.

TOLEDO, OHIO · THE F. BISSELL COMPANY · TRADE MARK




## The Keynote of High Accuracy

among Electrical Instruments is sounded by

**SIMPLEX**
TRADE MARK
**INSTRUMENTS**

They are guaranteed to maintain permanent high accuracy against any kind of jar, continued vibration or atmospheric change. This hardiness in construction is backed up by low cost. Don't you think it wise to ask for full particulars?

Send for Catalog D.

**THE SIMPLEX COMPANY**
**58 Nassau Street, Newark, N. J., U. S. A.**

N. Y. City Selling Agents: The E. A. Wilhelmi Co., 93 Reade St.

HELLER-BARNHAM, NEWARK, N. J.

# VEEDER SWITCHBOARD COUNTERS

**( STYLE 8 )**

Show rate of increase, so that exact calculations for the future may be made.

They likewise show how better to divide the work on the board among the operators.

Number of calls during each hour of the day can be shown. Interesting statistics are easily obtained by their use. Sockets fit in keyboard permanently. Counter can be inserted or removed at will.

Free Booklet describing 10 styles of Counters.

## THE VEEDER MFG. CO.

**No. 1 Sargeant St., HARTFORD, CONN.**

**Cyclometers, Odometers, Tachometers, Counters, and Fine Castings.**

Please tell the Advertiser you saw his Announcement in TELEPHONY.

# Financing
# Constructing
# Engineering

By

## THE GENERAL ENGINEERING COMPANY,
CHICAGO

**The Largest and Best Equipped Constructor of Telephone Plants in the West.**

Takes complete charge of telephone projects, prepares plans, furnishes and installs all materials and equipment. Erects exchange buildings, secures subscribers and, after construction, organizes the operation and maintenance departments, turning over to its owners the completely organized, working plant.

Undertakes to construct and operate a plant within fixed cost and efficiency limits.

Guarantees to completely construct and operate a plant within a fixed time.

Undertakes to so design and construct plants as to insure a pre-determined minimum percentage on the investment.

Lends assistance in financing approved propositions and underwrites desirable bonds.

Examines and reports upon the condition and value of existing plants.

Furnishes expert opinions and estimates on proposed new construction, extensions or improvements.

The most modern construction methods are employed. Plans are drawn in accordance with the best engineering practices and with special reference to local conditions. Close attention is given to efficiency of operation, maintenance and future development.

Contracts are accepted for a specified lump sum, or
Upon the basis of cost plus an agreed amount, or
Upon a percentage basis.

## The General Engineering Company

**Consulting and Contracting Engineers**

**135 Adams St.,**

**CHICAGO, U. S. A.**

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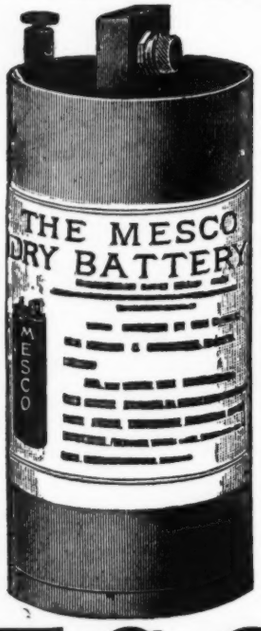
## Manhattan Electrical Supply Co.

New York and Chicago




$10\frac{1}{2}$ Cents $10\frac{1}{2}$ Cents

# MESCO

## The Dry Battery for Telephone Work

DRY battery reliability and saving—this is just what we offer you. In these and all other respects, Mesco superiority is universally acknowledged.

Made for telephone service, the Mesco is likewise the best battery for all work of an intermittent nature.

It has the strength, the lasting quality and the rapid recuperative powers that are needed for such work as we mention.

Mesco Dry Battery, standard size, is offered f. o. b. Chicago at these prices:

In lots of less than 12.....15c
In lots of 12 to 50.....13½c
In lots of 50 to 100.....13c
In lots of 100 or more.....10½c

WHERE high amperage is required, as is the case for Automobiles, Gas Engines, Gas Lighting, etc., our Hi-Up, 27 to 30 amperes, 3¼ x 7½ inches—or our No. 1 Special, 20 to 24 amperes, 2½ x 6 inches is recommended.

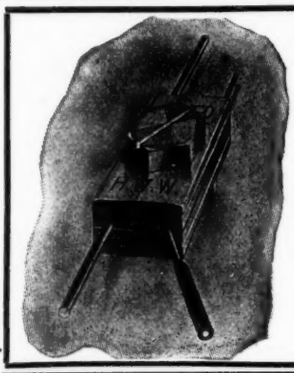
CATALOGUE No. 21, the 700 page Mesco Encyclopaedia of "Something Electrical for Everybody" is almost ready for distribution.

# MANHATTAN
## ELECTRICAL SUPPLY CO.

New York
32 Cortlandt St.

Chicago
188 Fifth Avenue





## The "H. W. W." Wire-Connector

Improved Type

The Standard Telephone Test Connector for Similar or Dissimilar Wires .040" to .104" Diameters

## Chicago Brass Co.

211-213 Lake Street Chicago



## FRANKEL'S ELECTRIC TESTING CLIP

Patented Nov. 15, 1904.

Get out of that rut of skinning the wires—IT'S EXPENSIVE.
This device will save both valuable time and material—THAT'S PROFIT.

Sample Dozens.....$ 1.50 per doz.
Lots of 100..... 11.00 per 100.
Lots of 500..... 10.00 per 100.
Lots of 1000..... 9.00 per 100.

The teeth grip the wire or binding post. The pin pierces the insulation and makes a perfect test connection.

FROM YOUR SUPPLY HOUSE, OR

**FRANKEL DISPLAY FIXTURE CO.**
718 Broadway, New York



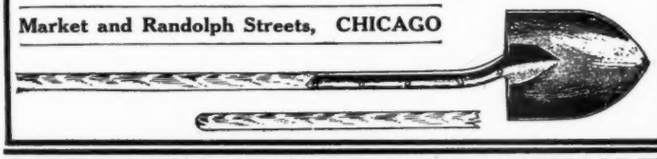
## H. CHANNON COMPANY

MANUFACTURERS OF

## Telegraph Shovels and Spoons

Our Bullock Shovels are the best.
We will mail our Shovel Catalogue upon request.

Market and Randolph Streets, CHICAGO



## WHY NOT USE THE BEST

AND THE ONLY GENUINE

## WRIGLEY PATENTED STEEL TOGGLE BOLT

with double flange sides and rigid back for securing brackets and fixtures to hollow tiling, marble slabs and steel ceilings. All other Toggle Bolts pivoted like cuts are infringements. The Trunnion Nut Toggle Bolt has a finished brass cap nut on the end. Hex. for wrench or round for screw driver plain or plated, and can be taken off after the bolt has been inserted, to place on the fixture. The bolt screws through the toggle plate the full length. Used for finished work, such as Telephones; Electric Fixtures and Marble Slabs. In ordering, mention if Trunnion Nut with Cap Nut or the plain Toggle Bolt is wanted.

THE THOMAS WRIGLEY CO., 300-306 Dearborn St., CHICAGO



## The Scranton Button Co.

Manufacturers of

Receiver Shells, Mouth Pieces, Bushings, Stage Plugs, Keystone Bases, Socket Rings, Push Buttons, Switch Handles, Switch Keys, Socket Keys, Crank Handles, and Watch Case Receiver Caps.

Samples furnished on application.

We furnish Receiver Shells for a great many telephone manufacturers

1501 Monadnock Building, Chicago
Telephones: Harrison 3262, Automatic 3862

# WASHINGTON FIR I·E·C CROSS ARM

A specialty is an article selected with especial care and especial reference to a given end by a firm or individual especially qualified for that purpose. Washington Fir Cross Arms are one of our specialties.
The Diamond Brand.

We selected the Washington Fir Cross Arms because we found them *superior* for telephone and telegraph purposes. They are doubly inspected and are employed exclusively by the Western Union and Postal Telegraph Companies. Nearly all of the other large cross arm consumers of the U. S. use them.
Get The Diamond Brand.

I·E·C

We carry complete stocks at Minnesota Transfer and Chicago and can fill all orders promptly. Have been doing an immense business with this line and every customer satisfied. Full carload orders shipped direct from mills at Walville, Wash. The Diamond Brand.

We are specialists in other good things for the telephone trade. If you have'nt already done so, get our catalogue, try our house and see if specializing does'nt pay. A trial order of Washington Fir Cross Arms --- The Diamond Brand --- will convince you. Quotations promptly furnished on anything you need.

# ILLINOIS·ELEC.CO. I·E·C CHICAGO, U.S.A.

Please tell the Advertiser you saw his Announcement in TELEPHONY.

# AJAX DRY BATTERIES

MORE CURRENT AND LONGER LIFE PER CENT OF COST THAN ANY BATTERY MADE

## FREE

Two Sample Ajax Dry Batteries Sent Prepaid Express to Any Telephone Company in the United States

Mention this ad and we will send samples as above with contract proposition

## SAMPLES

If you have not tried our **Fuse Blocks** let us know and we will send **Free Samples**

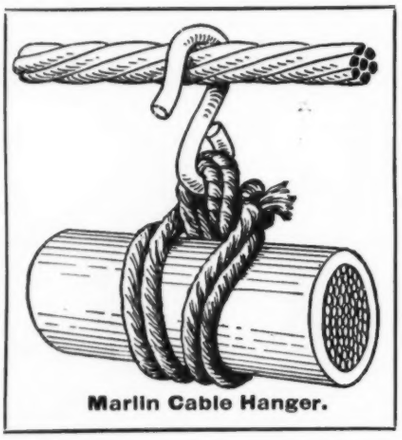
If you want the best Magneto Telephone on the market get our offer on two samples, prepaid freight, on trial at special price

## Central Telephone and Electric Co.

2133-35-37 Lucas Avenue, ST. LOUIS, U. S. A.

MANUFACTURERS OF HIGH-GRADE TELEPHONE APPARATUS—DEALERS IN EVERYTHING USED WITH TELEPHONES

Empire Electrical Supply Co., 334 Dearborn Street, Chicago Agents.



Marlin Cable Hanger.

## Our No. 3 Grade

—The Best
—Most Durable
—Strongest
—and Economical

MARLIN CABLE HANGERS
Being made today

## National Telephone Supply

1432 Superior Street, CLEVELAND, OHIO

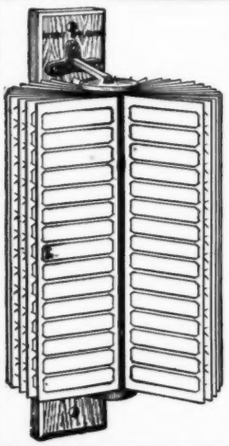
## Bridging Telephones with Condenser Coils FOR FARMERS' LINES

Will ring through with every receiver, but the first and last, off the hook.

*Send for Catalogue and Price List. Free on Application.*

## The D. A. Kusel Tel. & Elect. Mfg. Co.

1310 PINE STREET ST. LOUIS, MO.



## A Money-Making, Money-Saving Specialty

for Telephone Men and others.

## The 20th Century Wall Directory and Register

Holds 75 to 450 cards.

An economical device for both company and subscriber.

Sells wherever seen. Write for prices, discounts and special terms to agents.

You can use these directories to advantage in the Switchboard room. Always glad to send particulars.

Manufactured by

THE MAIL ORDER MFG. CO.

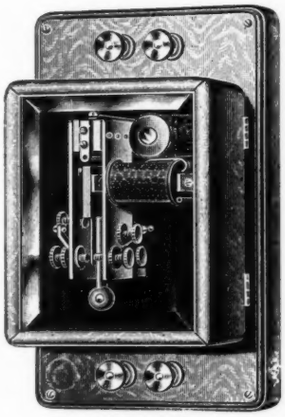
118 Randolph Street, :: CHICAGO, ILL.

Please tell the Advertiser you saw his Announcement in TELEPHONY.

# "Do You Get Our Rings"

**You would if you used our**

## POLE CHANGER



No. 1 Style.

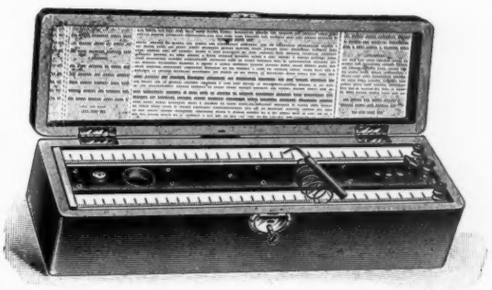
The simplest, most efficient and reliable ringer on the market. Measures only 9 x 6 x 5 and weighs but four pounds.

We use no primary battery for the vibrator and the consumption of current from the main batteries to operate this is practically nil.

Made in four styles—both alternating and pulsating.

**Prices $20, $25, $30, $40.**

## ILLINOIS DIRECT READING OHMMETER



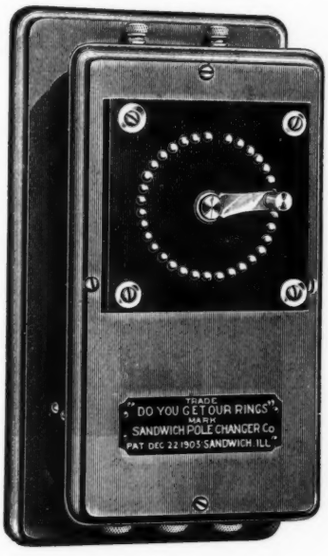
Pat. October 1, 1901. No. 683622.
Made with Galvanometer or Receiver.

An absolutely accurate instrument. A bridge set requires an expert—with our ohmmeter you can get your reading in ohms in a few minutes.

Made in four styles with ranges of from .01 to 100,000 ohms.

**Prices $20, $24, $28, $48.**

## ILLINOIS DUPLEXER




Is your toll line busy? Is your toll business profitable? Do you wish to increase your toll capacity 100 per cent. at a very small expense?

Let us hear from you and we will tell you how.

This is no experiment and we have had these instruments in practical use for several years. We own the exclusive patent on the balancing device to prevent cross talk. Made in three styles.

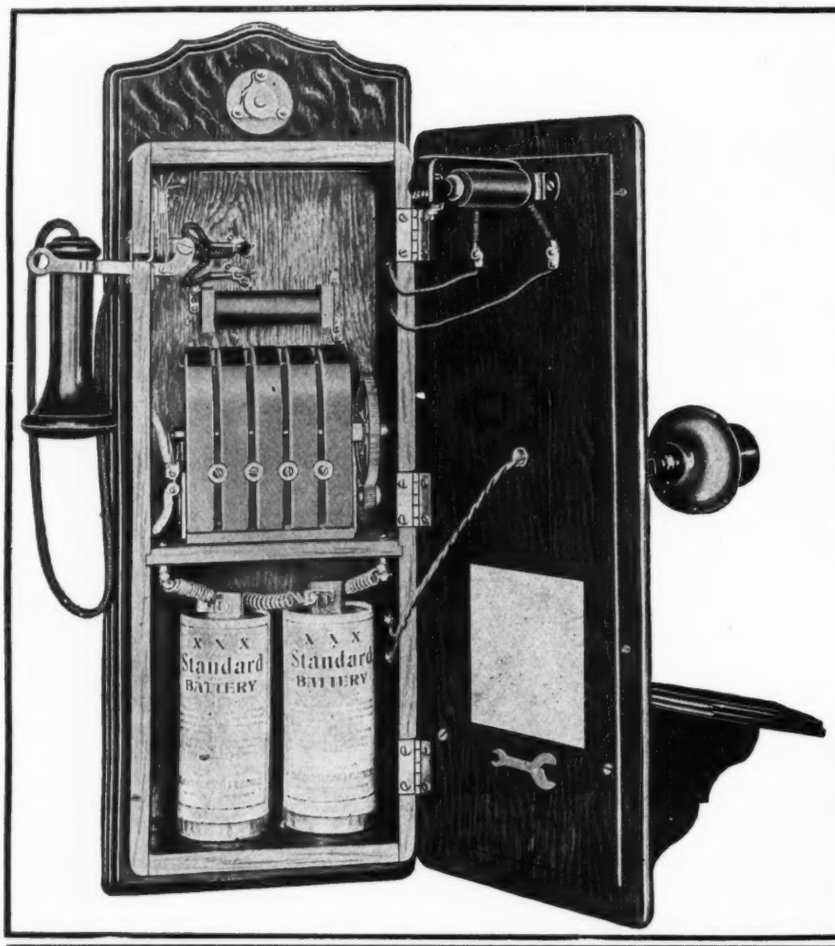
**Prices $10, $32, $40 per pair.**

Any of above goods shipped to responsible parties on 30 day's free trial to be returned at our expense if not entirely satisfactory.

LEASE RECORDS FOR YOUR OFFICE USE

# SANDWICH POLE CHANGER CO.

**100 Eddy Street, Sandwich, Ill.**




# A SCREW DRIVER

***is all that's needed to remove any part***

**Notice the hook—the coil—the ringer—the generator—the batteries—the transmitter—and receiver cord tips.**

**It is the only real accessible phone made.**

**SEND FOR PRICES**

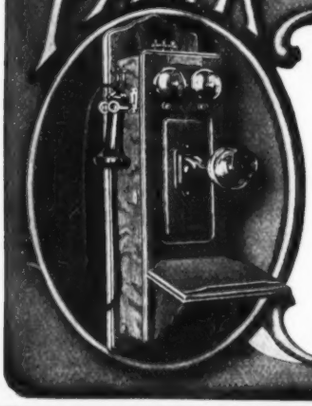
## STANDARD TELEPHONE AND ELECTRIC CO.

**348 JEFFERSON STREET**

**MILWAUKEE, WISCONSIN**

---

FARR LONG DISTANCE TELEPHONE FARR



**Exchange Telephones, Farmers' Telephones**

**Exchange Switchboards, Farmer Line Switchboards**

We are one of the oldest established Telephone manufacturers in Chicago. Full stock of Telephone Supplies—**Brackets, Pins, Poles, Crossarms, Glass Insulators, Dry and Wet Batteries, etc.**

ESTABLISHED 1895.

**1,000 TELEPHONES IN STOCK**

WE SHIP ALL ORDERS SAME DAY ORDER RECEIVED.

Try our Telephone on 30 days' trial. You can return it at our expense if not satisfactory. Send for Catalogue.

FARR TELEPHONE & CONSTRUCTION SUPPLY CO.,

118 and 120 W. Jackson Boulevard, CHICAGO, ILL.

---

## You Can "Chase Trouble" With This Machine and Overtake It in a Hurry

EVERY TELEPHONE COMPANY SHOULD HAVE A

# "Thoroughbred" Motor Cycle

The **THOROUGHBRED** Motor Cycle stands solely on its merits. Made of the celebrated Thor parts, it has distinctive features and valuable improvements of its own which commend it to the discerning and up-to-date buyer who wishes the best the market affords. Quality lives when price is forgotten, and quality has been our aim. The fame of the **"THOROUGHBRED"** rests on its quality. Its speed is easily regulated. From six to twenty miles per hour on the speed lever alone and, with the throttle opened, twenty to forty miles per hour can be attained and hills of nine to twenty per cent grade ascended. The control is in the right hand grip, and can be operated as easily and as effectively by a child as by a man. Under any and all conditions, recognized as the finest and most perfect piece of mechanism of its kind that has ever been produced.

**Write for Our Terms to Telephone Companies.** **IF YOU WANT A WINNER, GET A "THOROUGHBRED."** **Manufactured and For Sale by**

## Reading Standard Cycle Mfg. Co. :: :: Reading, Pa.

# CADIZ TELEPHONES

**THE MOGULPHONE**
**BEST MADE**

**THE CRESCENTPHONE**
**CHEAPEST THAT'S GOOD**

C.C.C. TELEPHONE APPARATUS TRADE MARK

## CONSIDER!

A telephone is either a priceless servant to the business man, a necessary luxury in the home and a big dividend earner for the operating company, or it is a worthless, expensive toy. There is no half way ground.

Cheap material, work half done, irresponsible labor, excessive novelty in designs will eventually result in break downs—always seriously disturbing the subscriber's business and social affairs, shaking the public's confidence in the company and destroying earning power.

It is not the claims of manufacturers set forth in clever advertisements, gorgeous catalogs, and striking pictures that determine the worth of a telephone in the long run.

It is the test in service, the cost of operation and repairs per year that shows the intrinsic value and earning power of equipment.

To those who have had the experience there is one "Trade Mark" that suggests itself whenever the highest grade equipment is considered, it is the shield and eagle that marks all Cadiz Apparatus.

This "Trade Mark" stands for refined and skillful workmanship, unquestionable honesty and scientific precision.

It means that the article bearing it is made up of perfect parts shaped to perform their work harmoniously and of dimensions and material such that they will wear indefinitely.

It stands for the best thought in Telephone Electro-mechanics.

These are general statements, but are sufficient when discussing products bearing this "Trade-Mark."

The exchange manager does not concern himself with the minutiea in the manufacture of our generators, ringers, transmitters, receivers and the multitude of parts—He **knows** they are made as they should be.

The exacting manager and engineer **knows** that when a "Mogulphone" or a "Crescentphone" is installed that it will be ready for immediate use any time of day or night. He **knows** that in an emergency the transmitter will not be found packed, the receiver or ringer out of adjustment nor the generator weak.

There is a stage in all arts when certain designs on account of their perfection fix a standard. Reliable authorities state that our 1906 models represent that period of development and that little change will be made in them in future years, hence money invested in Cadiz apparatus will be a permanent and profitable investment.

**SPECIAL** To those who have not yet become acquainted with our products—send description of telephones you are using, resistance of ringer, size of generator, number connected per line, together with bank reference and we will send two corresponding telephones on approval.

We will place our instruments in competition with any other make and if we fail to demonstrate that our product is more satisfactory and economical in service, you return the goods and we will pay the freight.

*25 LINE SWITCHBOARD*

# THE CADIZ ELECTRIC CO.

**3 C. C. C. BLDG., CADIZ, OHIO**

Please tell the Advertiser you saw his Announcement in TELEPHONY.

Standard Association Shield, Red, White and Blue

Patent applied for

# MAKE THE DIRT PILES TALK

The trick of advertising is first to **catch the eye** and then to impress upon the mind what the eye perceives.

To be successful the impression should be favorable.

There are two distinct forms of advertising. That form which compells recognition through persistent appeal in fixed form.

But probably the most successful is that form which commands recognition because of **meritorious novelty.**

**The Stroud Advertising Lantern Support belongs to the latter class.**

The American Shield is the recognized emblem of Independent Telephony. Get it before the people in every possible way and keep it before them. The liberal use of these stands will help wonderfully. Sample, any lettering, $3.00 with order. Liberal prices in quantities.

## H. D. STROUD

**5225 Kensington Avenue :-: :-: ST. LOUIS**

## We Want Your Business

Whether you are in the market and considering the merits of various telephone condensers or not, we want you to remember that every

## Andrae Condenser

is thoroughly tested and **proven perfect** before leaving the factory.

Our faith in these instruments prompts us to **equip an entire line on trial,** and the privilege of returning them at **our expense** is yours—if unsatisfactory.

We make them in the following styles and sizes:

**"Standard" Type XX**

of approved design, uniform capacity and made to withstand approximately 300 volts, alternating current, indefinitely. Hermetically sealed in a metal case and provided with terminals. Made as follows:

No. X-1, ¼ M.F. cap. size 2½x3x6½
No. X-2, ½ M.F. cap. size 2½x3x6½
No. X-3, 1 M.F. cap. size 3½x3x7
No. X-4, 1½ M.F. cap. size 4½x3x7½
No. X-5, 2 M.F. cap. size 4½x3x7½
No. X-6, 3 M.F. cap. size 4½x3½x7½

No. X-2, ½ M. F. capacity is the standard condenser for bridging telephones.

**No. 186 (Patented)**

is our latest and most practical form of condenser, fitted in a fine, quarter-sawed oak case. It matches any phone. Easy to install and especially adapted for telephones already in operation. Size, 8⅝ in. long; 4 7/16 in. wide; 1⅛ in. thick.

**Our "Special" No. 225**

is of compact form and can be used to good advantage in any bridging magneto box. Actual size, 2½x1½ in., including terminal clips.

WHY NOT WRITE FOR CATALOG No. 11 TO-DAY.

## Julius Andrae & Sons Co.

**217 West Water St. :: Milwaukee, Wis.**

# CABLE TERMINALS FOR CABLE CONSTRUCTION.

25 Pair Type B.

## Hall Cable Boxes

Neat, Substantial, Convenient, Designed for Underground and Aerial Installations, in all sizes; each pair provided with lightning protection.

Manufactured by

## THE MOUNTAIN STATE ELECTRIC CO.

**Correspondence Solicited. WHEELING, W. VA.**

# CENTURY
## 100% GOOD

**THE QUALITY** of your service—also the earning power of your exchange, depends largely upon the apparatus you are using.

**THEREFORE,** is it not good policy to use nothing but the best apparatus?

**OUR No. 65 MAGNETO** telephones will give your subscribers the very best service. Their use will also increase your dividends by reducing to the minimum your maintenance charges.

**OUR No. 65 MAGNETO** telephones have been carefully developed and perfected to such an extent that they can be relied upon for perfect service at all times.

**THESE TELEPHONES** are made up in all the different types, for all classes of service.

**YOU CAN MAKE** a thorough test of these telephones, we will send you one or two series or bridging instruments on 60 days' trial, charges prepaid.

**DON'T YOU THINK** this offer is worth considering? Send us your order.

CENTURY TELEPHONE CONSTRUCTION CO.
332 ELLICOTT STREET
BUFFALO, N.Y.

# 2 Two Successful "Standard" Specialties 2

## The "Standard" Pole Changer—The "Standard" Duplex Set

**Both of the very highest standard.** **We want every telephone man to have full particulars.**

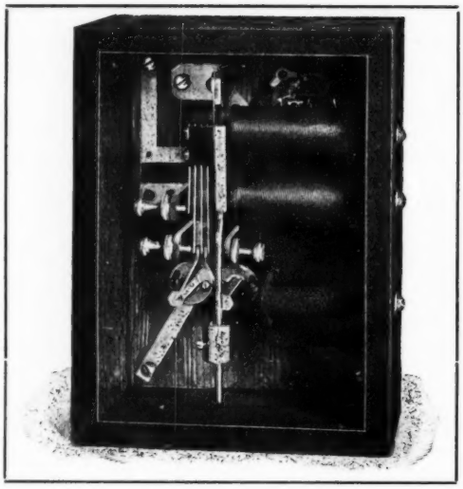
## The Standard Pole Changer

**Absolutely Guaranteed**

Simple, efficient, economical. Only one battery of forty to fifty ordinary dry cells required. Works perfectly on all alternating and direct pulsating current ringing.

Sent on 30 days' trial.

**Present price, only $15.00**



## The Standard Duplex Set

**Another Money Maker**

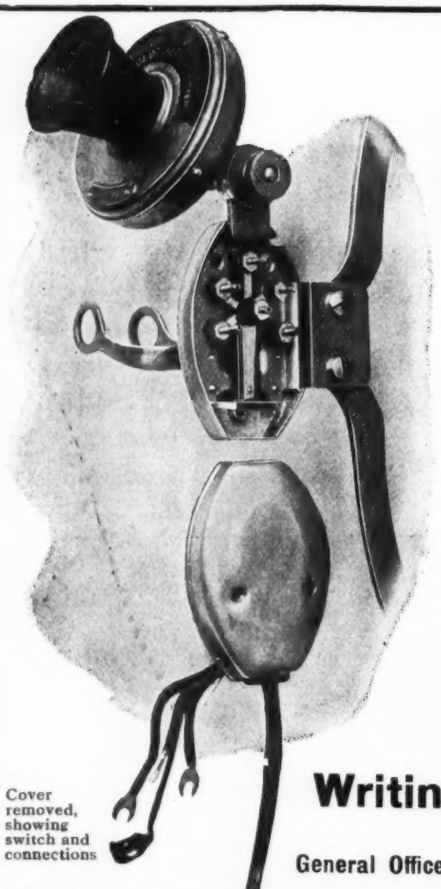
By using this instrument you can carry on two conversations over any single metallic bridging line without either conversation interfering with the other.

Sent on 30 days' trial.

Let us explain it to you.

**Price complete, per set, $15**

## CURRENT ELECTRIC COMPANY, 52 State St., CHICAGO



Cover removed, showing switch and connections

## THE ADJUSTAPHONE

### The Ideal Telephone

Adopted by both Independent and Bell Telephone Companies throughout the country.

*First cost less than desk set.*

Maintenance cost reduced to a minimum.

Made for roll top, flat top desk or wall.

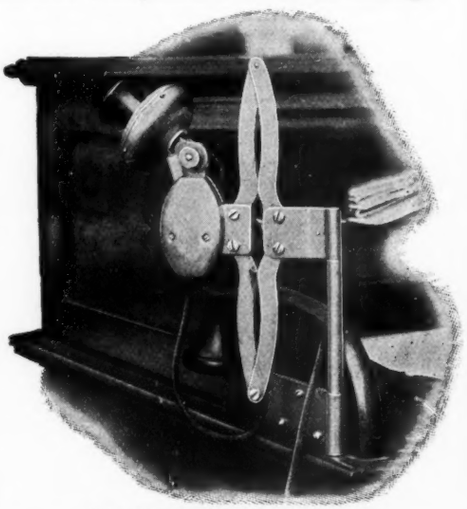
Write to-day for prices and full particulars.

**Address Telephone Department**

## Chicago Writing Machine Co.

**MANUFACTURERS**

**General Offices: 151-153 Wabash Ave., CHICAGO**

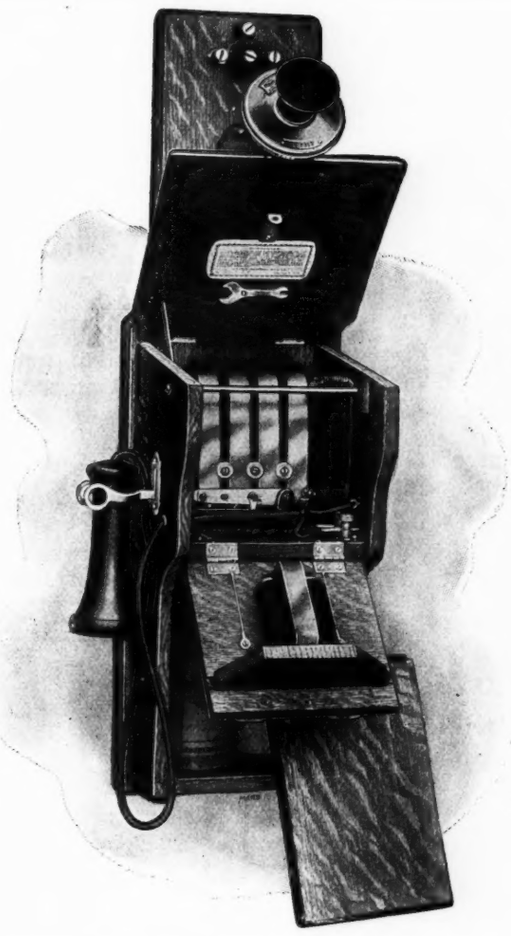


No. 1 Closed and swung out of the way.

Please tell the Advertiser you saw his Announcement in TELEPHONY.

# MONARCH APPARATUS

Common Battery Type Magneto Telephone



Series and Bridging

3 Bar
4 Bar
5 Bar

Selective Signalling

Although comparatively new, the telephone shown above is being used extensively. The cabinet is very similar in appearance to that most commonly used for central energy telephones. All parts are mounted conveniently. The writing shelf is hinged, and when raised, is supported by a brass arm. The front of the ringer box is also hinged. The battery box cover is removable. All the characteristic features and conveniences of Monarch Telephones are found in this instrument. A complete description of this telephone is contained in the new catalogue. A copy will be mailed upon request.

**MONARCH TELEPHONE MFG. CO.**

12-16 South Clinton Street Chicago, Illinois

Please tell the Advertiser you saw his Announcement in TELEPHONY.

# IT IS YOUR DUTY!
# LISTEN!

DO YOU KNOW

there is being manufactured

IN CHICAGO

DRY BATTERIES

by the

NEW ADVANCED FRENCH PROCESS,

especially adapted for HIGH-CLASS telephone service.

Dry Cells of all sizes.

! PROMPTEST SHIPMENTS. !

Ask us for prices and give us a fair trial. It is your duty.

These Batteries are highest quality of ANY NOW made.

Will recuperate QUICKER and last LONGER.

Try them, it is your duty.

## COLUMBIA DRY BATTERY CO.

**69-75 Wells St., Chicago**

# THE IDEAL OPERATOR'S CHAIR

## Don't Think of Your Back,

Think of your work. You won't know you have a back if you use a RICHARDS FIT-THE-BACK CHAIR,

the only chair that gives absolute comfort in sitting, such comfort as makes one feel that "Life's worth the living."

The Telephone Operators Chair, illustrated, is different from any chair you ever sat in. The back is pivoted and fitted with stiff springs so that it adjusts itself to any position assumed by the occupant within the limits of its travel, thus assuring continuous, comfortable support for the relaxed nerves and muscles of the back, knees and feet.

Telephone operators, whose work is usually most exacting, will find that the Richards Chair fits the back perfectly at all times and in every position. It reverses the old order of things. Instead of compelling one to adapt oneself to suit the chair the Richards Chair readily and comfortably adapts itself to the occupant and instead of tired, cross and half-ill operators your force will be found pleasant and alert.

**THE RICHARDS PIVOTAL "FIT-THE-BACK" OPERATOR'S CHAIR**

has a patent back of ample, restful proportions. A broad, flexible, yielding cane seat. An extended foot-rest leaving the knees in easy attitudes. In short, it is the IDEAL OPERATOR'S CHAIR.

**THE RICHARDS PIVOTAL "FIT-THE-BACK" OPERATOR'S CHAIR**

or any other of our line of office chairs will be sent free for inspection before a charge is made.

No. 4½S.

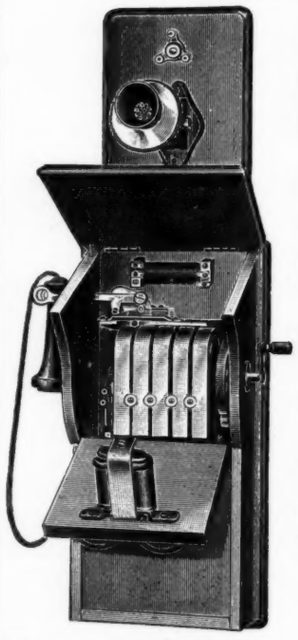
**We want every telephone manager or purchasing agent to know all about this chair. Write to-day.**

## RICHARDS CHAIR-PANEL COMPANY

**1103-8 WOMANS TEMPLE :: CHICAGO, U. S. A.**

# ARE YOU AWARE

**you are not giving yourself a fair show to secure the best results until you try our new**



## Inter State Trunk Line Central Energy and Magneto Telephones

**YOU CAN TALK BETTER** by using our new Inter State "Solid Back" Transmitter. Its perfect tone and great intensity can only be appreciated by a trial.

**YOU CAN HEAR BETTER** with our Long Distance "Loud Speaking" Receiver with no exposed metal parts and permanent adjustment.

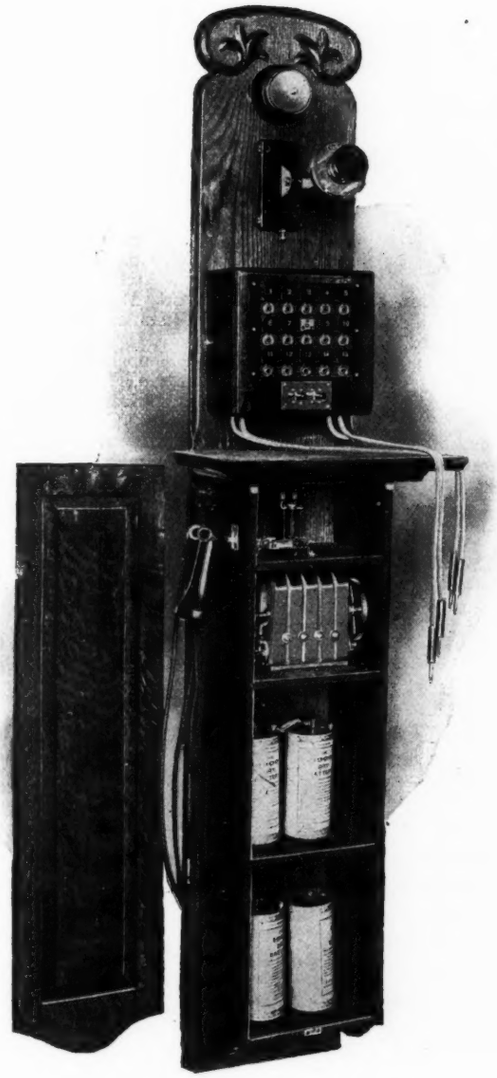
**YOU CAN RING BETTER** with our "Sampson" generator having imported steel magnets and Laminated Armature.

**Our Five Year Guarantee With Every Telephone.**

## United Telephone & Electric Co.

**ORRVILLE, OHIO, U. S. A.**

# THE NEW
# Eureka Electric Co.
## Genoa, Ill.



No. 71 Combined Phone and Switchboard.

15 Drop Capacity. Distinctive Features.

# Free

Booklet
"Letters of Credit"

# To

anyone sending request.
A postal card will bring it.

# You

will be benefited by the information.

Write to-day.

Please tell the Advertiser you saw his Announcement in TELEPHONY.

# DURING 1905

## American Self-Soldering Protectors have been installed in the following exchanges:

San Paulo Tel. Co., San Paulo, Brazil, S. A.
Compania Telepfonica Jalescience, Gaudalajara, Mex.
Cumberland Tel. Co., Shinimicas, Nova Scotia.
Rochester Tel. Co., Rochester, N. Y.
Home Telephone Co., Meridian, Miss.
Keystone Tel. Co., Philadelphia, Pa.
Atlanta Tel. & Tel. Co., Atlanta, Ga.
Home Tel, Co., Goshen, Ind.
Pioneer Tel. & Tel. Co., Oklahoma City, Okla.
Billings Mut. Tel. Co., Billings, Mont.
Citizens Tel. Co., Decatur, Ind.
Home Tel. Co., Excelsior Springs, Mo.
Merchants Mut. Tel. Co., Michigan City, Ind.
Home Tel. Co., Carthage, Mo.
Parke Co. Tel. Co., Rockville, Ind.
Imperial Const. Co., Shelbyville, Ky.
Phelps Co. Tel. Co., Holdredge, Neb.
Southwestern Tel. & Tel. Co. Dallas, Tex.
Saline Tel. Co., Saline, Mich.
Starke Co. Tel. Co., Canton, O.
Barnett Tel. Co., Rutledge, Mo.
Utah Ind. Tel. Co., Bigham City, Utah.
Berwick Tel. Co., Berwick, Pa.
Benzie Tel. Co., Benzonia, Mich.
Kirksville Tel. Co., Kirksville, Mo.
A. G. Thompson, Starr, S. C.
Galva Tel. Co., Galva, Ill.
Ind. Tel. Co. of Syracuse, Tully, N. Y.
United States Tel. Co., Cleveland, Ohio.
Howard Co. Tel. Co., Fayette, Mo.
Union Tel. Co., Alma, Mich.
City of Topeka, Topeka, Kan.
Memphis Tel. Co., Memphis, Tenn.
Marvell Tel. Co., Marvell, Ark.
Cuyahoga Tel. Co., Cleveland, Ohio.
Central Ga. Tel. Co., Macon, Ga.
Stark Co. Tel. Co., Alliance, Ohio.
Maysville Tel. Co., Maysville, Ky.
Leon C. Rice, Sutherland, Neb.
Prospect Tel. Co., Prospect, O.
Rushville Co. Op. Tel. Co., Rushville, Ind.
Henry Co. Tel. Co., New London, Ia.
Mansfield Tel. Co., Mansfield, Tex.
Larkin Co., Buffalo, N. Y.
Chipley Tel. Co., Chipley, Fla.
Utah Ind. Tel. Co., American Fork, Logan, Park City, Provo, Murray, Utah.
South Bend Home Tel. Co., South Bend, Ind.
Farm & Village Tel. Co., Moravia, N. Y.
Hawley Cheadle Const. Co., Clinton, Ia.
Holmes Elec. Prot. Co., New York.
Union Tel. Co., Midland, Mich.
Ideal Const. Co., McKenzie, Ky.
Olathe Citizens Tel. Co., Olathe, Kan.
Northwestern Ohio Tel. Co., Wauseon, O.
Dakota Central Tel. Lines, Aberdeen, S. D.
Mutual Tel. Co., Yazoo City, Miss.
Rossville Tel. Co., Rossville, Ill.
Flaggstaff Mut. Tel. Co., Flaggstaff, Ariz.
Georgia Tel. & Tel. Co., Savannah, Ga.
Bluffton Tel. Co., Bluffton, O.
Minot Light & Tel. Co., Minot, S. D.
Gillespie Tel. Co., Gillespie, Ill.
El Paso Tel. Co., Colorado City, Colo.
Carroll Co. Ind. Tel. Co., Savanna, Ill.
Holmes Elec. Prot. Co., Baltimore, Md.
Knightstown Tel. Co., Knightstown, Ind.
Massillon Tel. Co., Massillon, O.
Standard Tel. & Elec. Co., Dothan, Ala.
Fire Department, Des Moines, Ia.
Buffum Tel. Co., Bowling Green, Mo.
United States Tel. Co., Wilmington, O.
People's Rural Tel. Co., Woodstown, N. J
Auburn Tel. Co., Auburn, Ill.
Wolfe Brothers, Sunfield, Mich.
Oneonta Tel. Co., Oneonta, N. Y.
Arnold Mec. Power Station Co., Galena, Kan.
Brogo Valley Tel. Co., McGregor, Tex.
Lee Co. Tel. Co., Dixon, Ill.
Shelbyville Home Tel. Co., Shelbyville, Ky.
Lake Shore Tel. Co., Shelby, Mich.
Ideal Const. Co., Crofton, Ky.
Missouri Valley Tel. Co., Carrollton, Mo.
Edinburg, Gardner Tel. Co., Edinburg, N. D.
E. Dalton, Pocohontas, Ark.
Kibbie Tel. Co., South Haven, Mich.
Southwestern Home Tel. Co., San Jacinto, Cal.
Sandusky Tel. Co., Sandusky, Ohio.
Harlan & Avoca Tel. Co., Harlan, Ia.
Wabash Valley Tel. Co., Effingham, Ill.
W. H. Parker, Sanborn, Ia.
Pioneer Tel. & Tel. Co., Vinita, I. T.
Carlinville Tel. Co., Carlinville, Ill.
Moberly Tel. Co., Mobery, Mo.
Blissfield Tel. Co., Blissfield, Mich.
Wills-Point Tel. Co., Wills Point, Tex.
C. C. Brooks, Covington, Ga.
DeQueen Tel. Exchange, DeQueen, Ark.
Summerville Tel. Co.
Bremen Tel. Co., Bremen, Ind.
Platte Co. Ind. Tel. Co., Columbus, Neb.
Atchison Tel. Co., Atchison, Kan.
Middletown Tel. Co., Middletown, Ind.
Memphis Long Distance Tel. Co., Holly Springs, Miss.
Citizens Tel. Co., Kenosha, Wis.
Delaware Co. Tel. Co., Manchester, Ia.
Piedmont Elec. Co., Branchville, S. C.
Red River Valley Tel. Co., Climax, Minn.
Argenta Tel. Co., Argenta, Ill.
Granbury Tel. Co., Granbury, Tex.
Standard Tel. & Tel. Co., Abbeville, Ga.
Bell Tel. Co., Lanoke, Ark.
Citizens Tel. Co., Holland, Mich.
Portage Tel. Co., Portage, Wis.
Georgia Tel. & Tel. Co., Savannah, Ga.
Home Tel. Co., Grand Island, Neb.
Plattsmouth Tel. Co., Plattsmouth, Neb.
Arkadelphia Tel. Co., Arkadelphia, Ark.
Home Tel. Co., Punxsutawney, Pa.
Rock Hill Tel. Co., Rock Hill, S. C.

## We have also received orders for Self-Soldering Equipments from the following manufacturers:

| | |
|---|---|
| **Stromberg-Carlson Tel. Mfg. Co.,** | **Rochester, N. Y.** |
| **Automatic Electric Co.,** | **Chicago, Ill.** |
| **Dean Electric Co.,** | **Elyria, Ohio** |
| **North Elec. Co.,** | **Cleveland, Ohio** |
| **Chicago Tel. Sup. Co.,** | **Elkhart, Ind.** |
| **B. R. Elec. & Tel. Mfg. Co.,** | **Kansas City, Mo.** |
| **Central Tel. & Elec. Co.,** | **St. Louis, Mo.** |
| **Central Tel Const. Co.,** | **Buffalo, N. Y.** |
| **Erickson Tel. Mfg. Co.,** | **New York and Stockholm, Sweden** |
| **Eastern Tel. Mfg. Co.,** | **West Chester, Pa.** |
| **Eureka Electric Co.,** | **Genoa, Ill.** |
| **International Tel. Mfg. Co.,** | **Chicago, Ill.** |
| **Monarch Tel. Mfg. Co.,** | **Chicago, Ill.** |
| **Standard Tel. & Elec. Co.,** | **Milwaukee, Wis.** |
| **Sumter Tel. Mfg. Co.,** | **Sumter, S. C.** |
| **Vought Berger Co.,** | **La Crosse, Wis.** |
| **Western Tel. Mfg. Co.,** | **Chicago, Ill.** |
| **Conn. Tel. & Electric Co.,** | **Meriden, Conn.** |
| **Hipwell Tel. Mfg. Co.,** | **Allegheny, Pa.** |

# AMERICAN ELECTRIC FUSE CO.

## MUSKEGON, MICH.

**NEW YORK** **ATLANTA**

**Please tell the Advertiser you saw his Announcement in TELEPHONY.**

*"From Greenland's Icy Mountains,*
*From India's Coral Strand."*

Well, hardly that, yet

# American Self-Soldering Protectors

are used all the way

**From Oregon to Florida**

AND

**From Nova Scotia to South America**

## Beware of Infringements and Imitations

**The following patents were issued October 3, 1905**

| | |
|---|---|
| 800820 | 800827 |
| 800821 | 800828 |
| 800822 | 800829 |
| 800823 | 800830 |
| 800824 | 800831 |
| 800825 | 800832 |
| 800826 | 800833 |

OVER 100 PATENTS ARE STILL PENDING

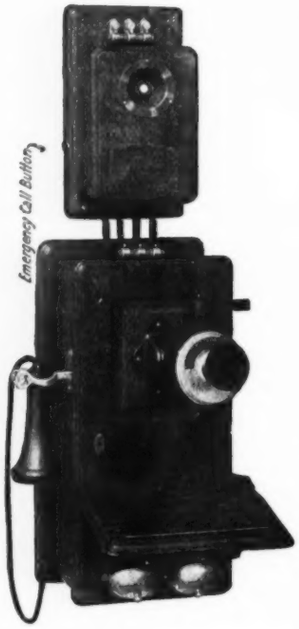
# AMERICAN ELECTRIC FUSE CO.

MUSKEGON, MICH.

NEW YORK ATLANTA

Please tell the Advertiser you saw his Announcement in TELEPHONY.

# ONE NEW SECRET SERVICE INSTRUMENT EVERY DAY for five consecutive months




THIS IS THE AVERAGE PURCHASE OF ONE OF OUR CUSTOMERS.

19 Phones on one party line.
1 Subscriber talking.
18 Subscribers who can't hear a word.
18 Emergency calls ready for instant use.
1 Bell rings at a time.

The upper box holds all the secret service mechanism and can be attached to any bridging phone.

SEE HOW EASY it is to attach. Just connect the wires.

LET US TEACH YOU HOW TO EARN DIVIDENDS

"RUBBERING"

AND HOW TO~ STOP IT~

**Baird Manufacturing Co.** ::

No. 3 MICHIGAN ST., CHICAGO, U. S. A.

# Guaranteed Telephones and Switchboards

Columbia Series and Bridging Telephones $.....

Write us for prices if you want to save money

## Our Bargain Counter is Loaded with

Stromberg-Carlson
Receivers and Transmitters
Sterling Terminals
American Terminals
Cook Terminals
Condensers, Voltmeters
Ammeters and Bridges

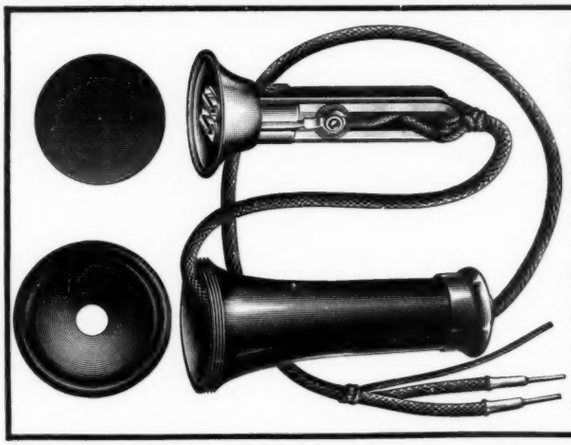
We have bought the entire Ringer stock of the McDermid Mfg. Co. (Bankrupt), and while this stock lasts, will sell 80, 500, 1,000 and 1,600 Ohm Ringers at less than manufacturer's cost.

If you mean business get in line quick.

We buy and sell second-hand apparatus.

**GUARANTEE TELEPHONE & EQUIPMENT CO.**

60-68 West Van Buren Street, :: CHICAGO, ILL.



Illinois Specialty Mfg. Co.

High Grade Telephone Receivers a Specialty

Prices the Lowest

97-101 S. Clinton Street Chicago

## Mr. Business Man

Why not start the New Year with a clean sheet?

Let us go over your business system, check up your different departments, discover wrong methods and suggest the remedies.

**BAKER-VAWTER AUDITS**

stop the "leaks," correct wrong practices, safeguard you from the result of ignorance and dishonesty. Our charges are trifling compared to the saving we make you.

Let our representative tell you our plan.

**BAKER-VAWTER COMPANY,**

AUDITORS, PUBLIC ACCOUNTANTS, DEVISERS OF BUSINESS SYSTEMS.

350 Broadway, New York. :: Tribune Building, Chicago.

Please tell the Advertiser you saw his Announcement in TELEPHONY

# Time Devoted to the Foundation May Save Rebuilding

THE PIONEER INDEPENDENT TELEPHONE FACTORY ESTABLISHED 1893

## Type E Drop

The drops and jacks in the Western Express switchboard are self-contained and each drop and jack can be removed from the board without interfering with any other drop or jack. The drop coil is incased in a tube of Norway iron. The night bell contacts are positive in action and are insulated from all other parts. All parts of drop and jack are easily accessible and can be removed or replaced easily. Jack springs are of heavy German silver mounted in a hard rubber block. All jack springs are provided with binding posts and the connecting wires are fastened under a screw and washer. This method insures a good contact and allows connections to be readily removed for testing.

Type E Magneto Switchboard Drop Showing Target After Signalling.

We produce switchboards and telephones, both Magneto and Central Energy, any size from 3 to 10,000 lines. Complete specifications and blue prints will be sent promptly upon application.

CONSULT WITH US BEFORE LAYING THE FOUNDATION.

# Western Telephone Manufacturing Co.

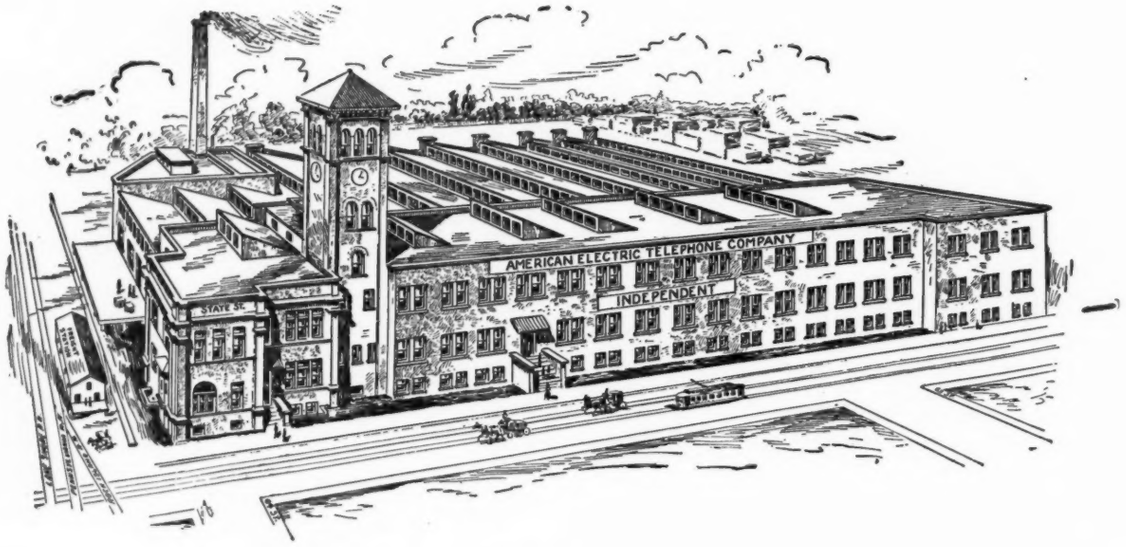
THE PIONEER INDEPENDENT TELEPHONE FACTORY.

Established 1893.

CHICAGO

Please tell the Advertiser you saw his Announcement in TELEPHONY.

# OUR NEW FACTORY




**American Electric Telephone Company**

**State and 64th Streets, :: :: CHICAGO, ILL., U. S. A.**

# Country Party-Line Telephones

## Special Circuit Connections Ring Thro' Condensers

These telephones can be rung even with all of the receivers removed from the hooks.

You can't do without them.

"Rubbering" will not put these telephones out of business. SOMETHING NEW. SPECIAL PUSH BUTTONS.

**WRITE FOR PARTICULARS TO**

## Keystone Electric Telephone Company

**822 FIFTH AVENUE, PITTSBURG, PA.**

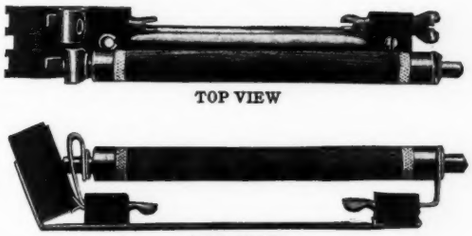
Please tell the Advertiser you saw his Announcement in TELEPHONY.

# Two New Cook Terminals

TYPE T-6
Combines terminal and distributing ring. Very economical. For multiple tap cable work

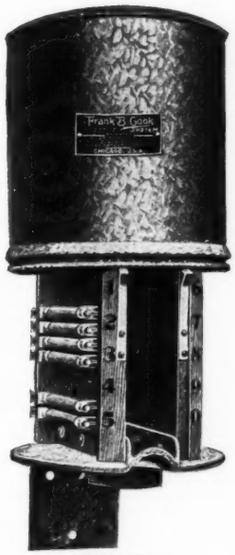
Designed Especially
——— for ———

## MULTIPLE TAP CABLE DISTRIBUTION



TOP VIEW

SIDE VIEW
Two views of individual protector mounts for use on Type T-4 and Type T-6, Cook Terminals



TYPE T-4
New terminal for multiple tap cable distribution

**Order any initial capacity and increase it as desired, by simply adding protectors—one pair at a time**

**Write for new terminal catalogue describing these and all other Cook terminals**

Frank B. Cook. Mfr.

242 WEST LAKE STREET CHICAGO, U. S. A.

Please tell the Advertiser you saw his Announcement in TELEPHONY.

# Read This Expert Testimony

**WHEN YOU ARE RIGHT, GO AHEAD.**

Kempster B. Miller says: "The Lundquist patents already issued contain valid claims which cover the Lundquist system of trunking." These claims clearly cover all of the large automatic systems now in operation in this country and dominate the automatic art as it is now practiced in the operation of large automatic exchanges."

Casper L. Redfield says: "Lundquist originated his system, developed it through several stages and filed his applications for patents before it was known to any one other than himself and his attorney. The applications were kept alive through proper actions in the Patent office so that his title is complete from the earliest date to the present moment. As against Lundquist, there have been no interferences in the Patent Office and no one has arisen in public print or otherwise, who has claimed to have originated it. Lundquist's claim that he is the inventor of this system is a matter of record and stands unchallenged by any one. Neither can any one at this late date successfully maintain such a claim. The length of time which has elapsed since Lundquist filed his cases and the system has been known and used in the United States, and the existence of certain foreign patents, now place a statutory bar to any one other than Lundquist obtaining a patent upon it."

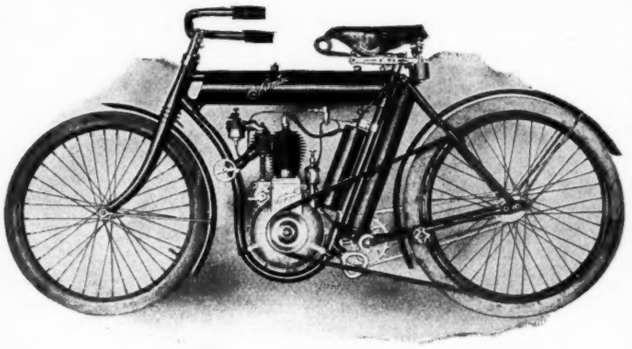
**The system contains every necessary improvement to make it durable, absolutely reliable and unlimited in its capacity. Practical for every condition.**

For further information address

**The Globe Automatic Telephone Co.**

CHICAGO, ILLINOIS.

# The 1906 ARMAC Motor-Cycle



## "Trouble-Mens" Troubles Made Easy

The ARMAC is equipped with a guaranteed full 3 H. P. motor and is "always ready" to mount and go at a moment's notice.

Ample power to carry rider and repair outfit over any road or up any grade.

Has fuel capacity of 100 miles and a range of speed from 4 to 40 miles per hour which is under absolute control of the right hand grip at all times.

Our catalog fully describes the practical, reliable and up-to-date ARMAC.

Special inducements to telephone employes.

WE WANT YOUR NAME ON OUR MAILING LIST

**Armac Motor Co.,** CHICAGO, ILL.

# General Insulate & Machine Co.

Manufacturers of

**SEAMLESS RECEIVER CASES**

Mouthpieces Handles, Knobs

**SEAMLESS** **SEAMLESS**

Quality Unrivaled Superior Finish

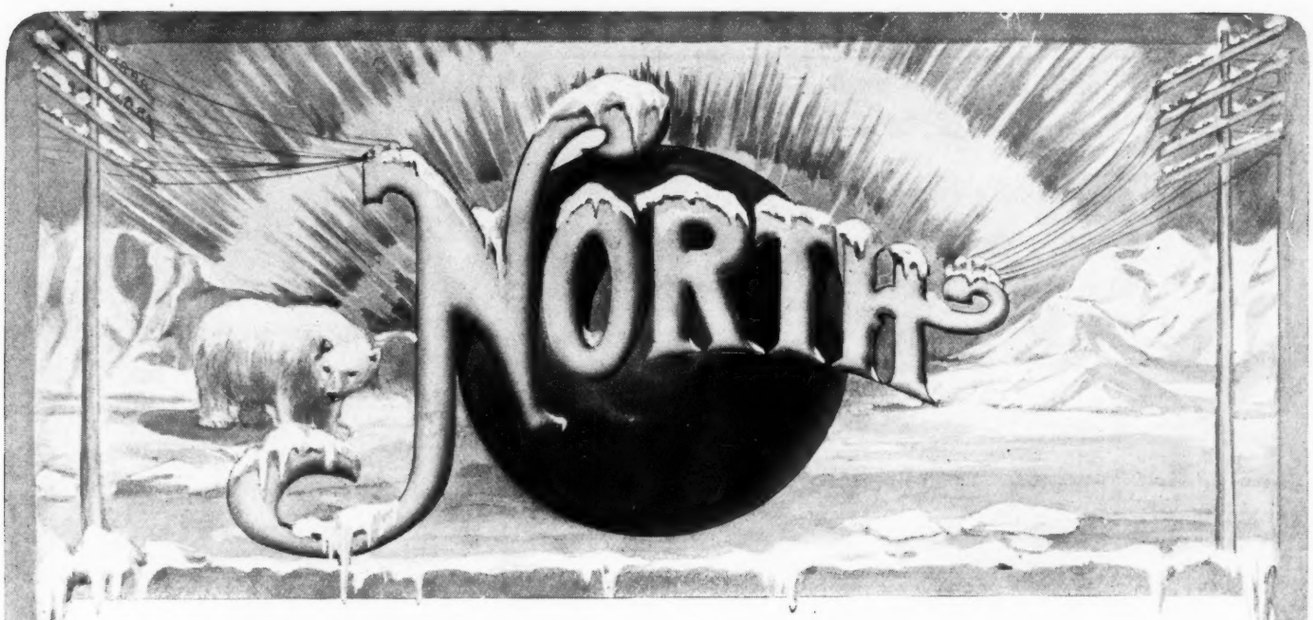
Unexcelled in Mechanical Detail

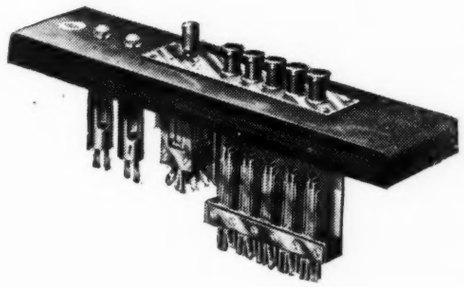
Highest Grade Material

ALL KINDS OF ELECTRICAL INSULATIONS

**GENERAL INSULATE & MACHINE CO.**

Factory: Brooklyn, N.Y. 1214 Chicago Stock Exchange Bldg. Tel. Main 3924. CHICAGO, ILL.



¶ The growth of party line service demands the installation of Individual Selective Ringing Keys; for their indicating feature renders the aggregate service faster—if the called party does not answer promptly, it is not necessary to ask the number a second time.

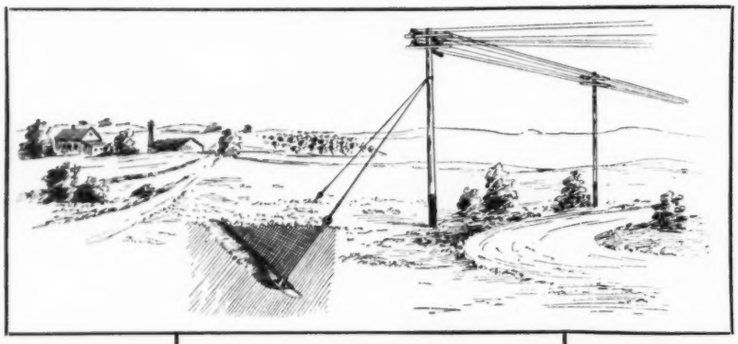
¶ The listening-in is controlled by a cam in the usual way, while the buttons are for ringing in each of the four parties. In order to ring it is necessary to press the button clear down. Upon being released, the ringing circuit is opened, but the key does not revert to its normal position—it remains slightly below the level of the other buttons so that in case a called subscriber does not answer promptly and must be rung a second time, the operator, if she has forgotten, knows which party is wanted without again asking. It is restored by pressing a succeeding button or the fifth or release key, which also serves for ordinary straight line alternating current ringing.

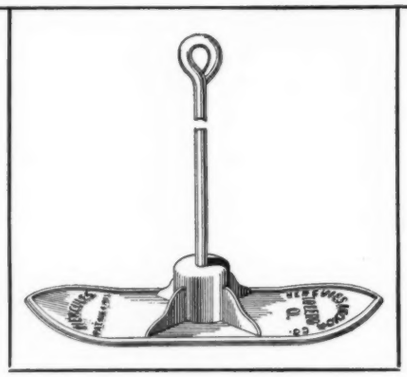
¶ The plungers of **"NORTH'S"** Individual Keys have a shorter distance to travel than other makes, and are therefore "sure ring" even in the case of a careless operator. The contact springs are longer than usual; they are more supple and resume their normal position after unusual and frequent strain.

¶ They are entirely self contained, mounted on the same escutcheon with the listening key when so ordered, and easily added to any keyboard.

**CHICAGO, ILL. CLEVELAND, O. DALLAS, TEX.**

THE
NORTH ELECTRIC CO.
CLEVELAND, OHIO





# "Hercules" Anchors

## THE ONLY MALLEABLE IRON ANCHOR

"Hercules" Anchors pull against the solid earth.

"Hercules" Anchors cannot creep.

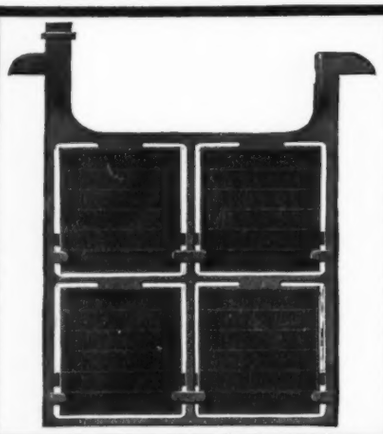
"Hercules" Anchors will not break.

"Hercules" Anchors are easy to set.

"Hercules" Anchors are strongest made.

—— SEND FOR ——
CIRCULARS AND PRICES

**The W. G. Nagel Electric Co.,** Perry and St. Clair Streets TOLEDO, OHIO



**ABOVE ALL OTHER CONSIDERATIONS**

ELECTRIC STORAGE BATTERIES OF THE "Unit Accumulator" TYPE ARE

# RELIABLE

FOR CENTRAL ENERGY TELEPHONE SYSTEMS
Ask for Bulletin on "A MODERN TELEPHONE EXCHANGE"

BRANCH OFFICES: NEW YORK CHICAGO

**National Battery Company,** BUFFALO, N. Y.

DON FARNSWORTH FRANK L. BILLS

# FARNSWORTH, BILLS & CO.

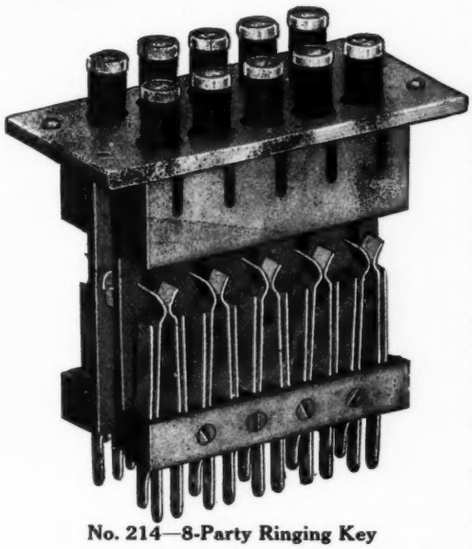
# High Grade Telephone Stocks & Bonds

Suite 350 Railway Exchange

TELEPHONE Strowger Automatic 9719 Bell, Harrison 2810 JACKSON AND MICHIGAN BLVDS. CHICAGO, ILL.

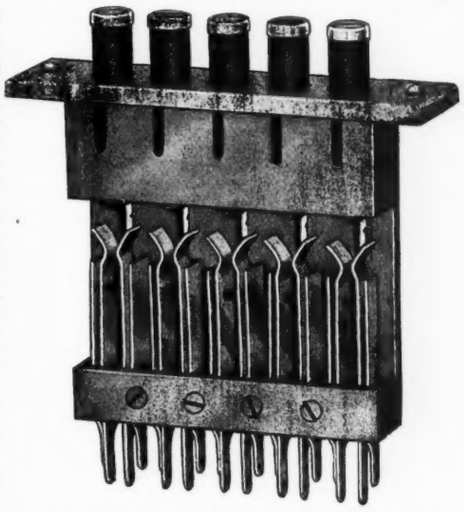
Please tell the Advertiser you saw his Announcement in TELEPHONY.

# SELECTIVE KEYS



No. 214—8-Party Ringing Key

ON account of the great demand for our four-party selective system, patent on which was issued Sept. 5th, 1905, and which covers all practical forms of high and low frequency ringing systems, we have made special efforts to produce the four-party key which we have found in service to give the very best results. We use a substantial brass framework for the key, surmounted by a neat nickel top through which project the 5 plungers that actuate the ringing springs. We have found that metal plungers will stand the strain of service in the best possible manner and for this reason all of these plungers are constructed of metal. Each one is provided at its upper extremity with a neat design, the various designs being of different colors and being numbered or lettered, as required. The lower part of the plungers are provided with hard rubber rollers, which rubber rollers engage the ringer springs and select the various kinds of currents for the ringing keys with which the selective master's key is associated. All of the ringer springs are of substantial German Silver and are mounted in hard rubber. The free upper ends of these springs are guided to their normal position by means of small rubber guides, which are clearly shown in the illustration, which maintain the correct position not only of the inner but also of the outer springs. The various plungers are interlocking, and when one of them is depressed they will remain in the depressed position; when another of the plungers is depressed the plunger previously depressed will resume its normal position.



No. 212—4-Party Ringing Key—Front View

## NOTICE

4 On Sept. 5th, 1905, the U. S. Patent Office issued to Oscar M. Leich the dominating patent on Selective Four Party Telephone Ringing Systems covering all present practical forms of high and low frequency systems, together with all so-called harmonic or different frequency arrangements. We are sole licensees under said patent. 4

## We Issue the Following Catalogues and Bulletins:

No. 7—Combined Telephone and Switchboard.
" 8—Wall Switchboard.
" 9—Samson Telephone.
" 10—American Express Switchboards.
" 11—Desks—Toll and Private Branch.
" 12—Visual Signal and Bell Style Switchboards.
" 13—Intercommunicating Systems.
" 14—Line Material and Supplies.
" 15—Bell Express Self-Restoring Switchboards.
" 16—Operator's Set and Accessories.
" 17—Parts of Apparatus.
" 18—Magneto Telephones of All Kinds.
No. 19—Central Energy Switchboards.
" 20—Central Energy Telephones.
" 21—Protective Apparatus and Terminal Equipment.
" 22—Construction of Country Telephone Lines.
" 23—Eight-Party Selective Ringing Telephones.
" 24—Composite Telephone and Telegraph Lines.
" 25—Four-Party "Leich" Selective Telephone System.
" 26—Telephone Power and Ringing Equipment.

## AMERICAN ELECTRIC TELEPHONE CO.,

STATE & 64TH STREETS, ENGLEWOOD STATION, CHICAGO, ILLINOIS

# POINTERS

**We Can Save You Money.**
**Give You Better Quality Material.**

**WRITE OUR TELEPHONE DEPT. FOR ADVICE**

## Commercial Electrical Supply Co.

**1007-1009 Market Street, St. Louis, Mo.**




## IT CAN'T JAR LOOSE.

**There is only one excuse for the Fahnestock Spring Binding Post.**

**It's better than any other kind.**

**It's good anywhere, but particularly good for dry batteries.**

**You press down on the spring, insert the wire and let go.**

**The spring grips the wire and never lets go until you want it to.**

**It's a permanent positive connection and the best part of it is that you can have this connector on your batteries at no extra cost.**

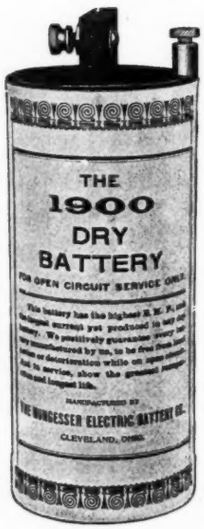
**Just ask for it, no matter what make of battery you use.**

**Let us "show you" by sending a sample post. It's free.**

## THE FAHNESTOCK ELECTRIC CO.

**134 Havemeyer Street BROOKLYN, N. Y.**

### How Batteries Fool Folks.




Initial measurements of Dry Batteries are misleading in many cases. They are often obtained by introducing into the battery compound certain acids which act as **a stimulant** to the activity of the cell. These, however, like all other stimulants have **a bad after-effect,** and by inducing local action, materially shorten the life of a cell.

Now, if your batteries have been running down quickly, and your battery cost consequently high, try ***The 1900,*** a battery made especially for telephone use, and **honestly made.** A battery which attains, through careful, scientific construction, an initial amperage of 18 to 20 amperes and an E. M. F. of 1.5 volts. A battery made without stimulants, one that will stand a time test.

The only way to tell just how good "1900 Service" is is to try a few cells.

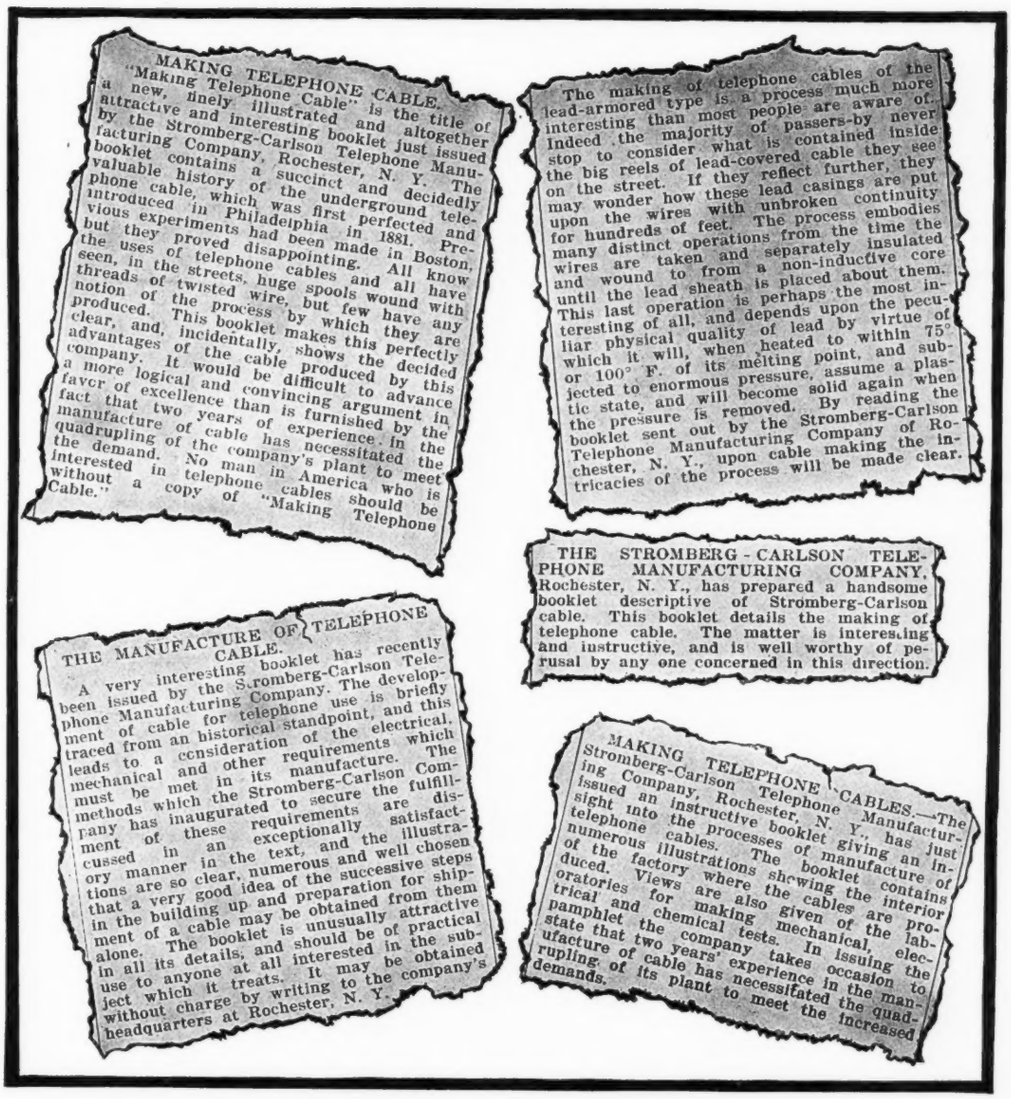
Almost any first-class electrical dealer will supply you.
Send for complete catalogue of Dry Batteries for every purpose.

THE NUNGESSER ELECTRIC BATTERY CO.,
CLEVELAND, OHIO, U. S. A.
General Sales Office, 128 W. Jackson Boulevard, Chicago.

**Please tell the Advertiser you saw his Announcement in TELEPHONY.**

# WE MAKE CABLE

## YOU SHOULD HAVE A COPY OF THIS BOOK



MAKING TELEPHONE CABLE.

"Making Telephone Cable" is the title of a new, finely illustrated and altogether attractive and interesting booklet just issued by the Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y. The booklet contains a succinct and decidedly valuable history of the underground telephone cable, which was first perfected and introduced in Philadelphia in 1881. Previous experiments had been made in Boston, but they proved disappointing. All know the uses of telephone cables and all have seen, in the streets, huge spools wound with threads of twisted wire, but few have any notion of the process by which they are produced. This booklet makes this perfectly clear, and, incidentally, shows the decided advantages of the cable produced by this company. It would be difficult to advance a more logical and convincing argument in favor of excellence than is furnished by the fact that two years of experience in the manufacture of cable has necessitated the quadrupling of the company's plant to meet the demand. No man in America who is interested in telephone cables should be without a copy of "Making Telephone Cable."

The making of telephone cables of the lead-armored type is a process much more interesting than most people are aware of. Indeed the majority of passers-by never stop to consider what is contained inside the big reels of lead-covered cable they see on the street. If they reflect further, they may wonder how these lead casings are put upon the wires with unbroken continuity for hundreds of feet. The process embodies many distinct operations from the time the wires are taken and separately insulated and wound to from a non-inductive core until the lead sheath is placed about them. This last operation is perhaps the most interesting of all, and depends upon the peculiar physical quality of lead by virtue of which it will, when heated to within 75° or 100° F. of its melting point, and subjected to enormous pressure, assume a plastic state, and will become solid again when the pressure is removed. By reading the booklet sent out by the Stromberg-Carlson Telephone Manufacturing Company of Rochester, N. Y., upon cable making the intricacies of the process will be made clear.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, Rochester, N. Y., has prepared a handsome booklet descriptive of Stromberg-Carlson cable. This booklet details the making of telephone cable. The matter is interesting and instructive, and is well worthy of perusal by any one concerned in this direction.

THE MANUFACTURE OF TELEPHONE CABLE.

A very interesting booklet has recently been issued by the Stromberg-Carlson Telephone Manufacturing Company. The development of cable for telephone use is briefly traced from an historical standpoint, and this leads to a consideration of the electrical, mechanical and other requirements which must be met in its manufacture. The methods which the Stromberg-Carlson Company has inaugurated to secure the fulfillment of these requirements are discussed in an exceptionally satisfactory manner in the text, and the illustrations are so clear, numerous and well chosen that a very good idea of the successive steps in the building up and preparation for shipment of a cable may be obtained from them alone. The booklet is unusually attractive in all its details, and should be of practical use to anyone at all interested in the subject which it treats. It may be obtained without charge by writing to the company's headquarters at Rochester, N. Y.

MAKING TELEPHONE CABLES.—The Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., has just issued an instructive booklet giving an insight into the processes of manufacture of telephone cables. The booklet contains numerous illustrations showing the interior of the factory where the cables are produced. Views are also given of the laboratories for making mechanical, electrical and chemical tests. In issuing the pamphlet the company takes occasion to state that two years' experience in the manufacture of cable has necessitated the quadrupling of its plant to meet the increased demands.

## IT WILL POST YOU HOW TO BUY CABLE.

**WE MAIL IT FREE. ASK FOR BOOKLET NO. 79-C.**

# STROMBERG-CARLSON TELEPHONE MFG'CO.

ROCHESTER., N.Y. CHICAGO., ILL.

Please tell the Advertiser you saw his Announcement in TELEPHONY.

# LONG DISTANCE RECEIVER

Remember, the shell and cap cannot be broken, thus insuring great saving in maintenance.

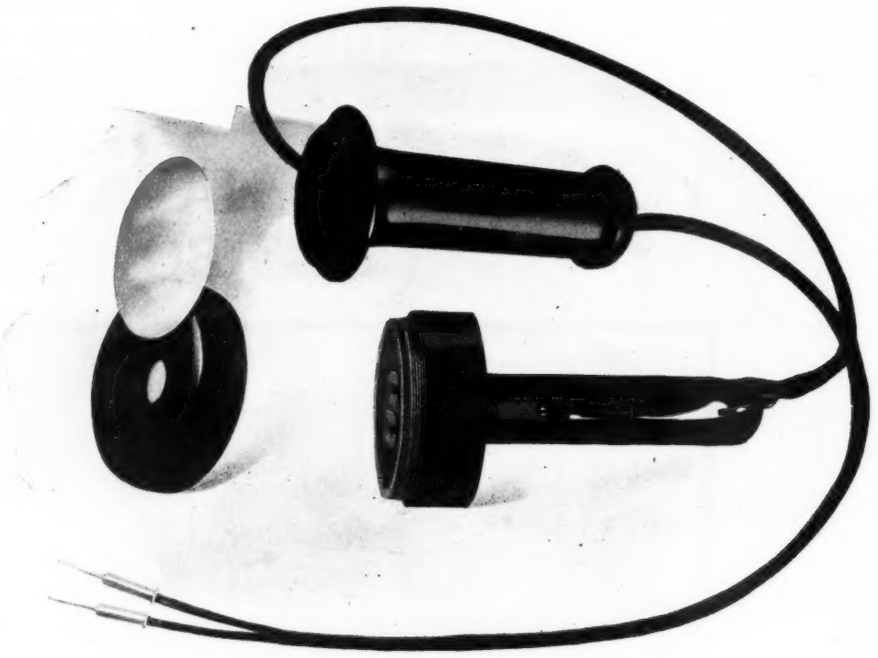
This receiver should give from 20 to 30 years perfect service.

It is practically indestructible.

Each and every part of the instrument has been designed to accurately fit its component part, thus making all parts interchangeable.

Each and every hole and screw hole has been drilled by the use of the finest set of templets, jigs and dies that has ever been designed.

Write for Receiver and Transmitter Bulletin and Long Distance Bridging Telephone Bulletin.



PATENTED.

## LONG DISTANCE TELEPHONE SALES COMPANY,

Manufacturers of scientically and mechanically correct telephone apparatus.

JACKSON BLVD. AND CANAL ST., CHICAGO

# DON'T!!

## THIS MEANS YOU

DON'T buy a Protector and Distributing Board until you get particulars about our

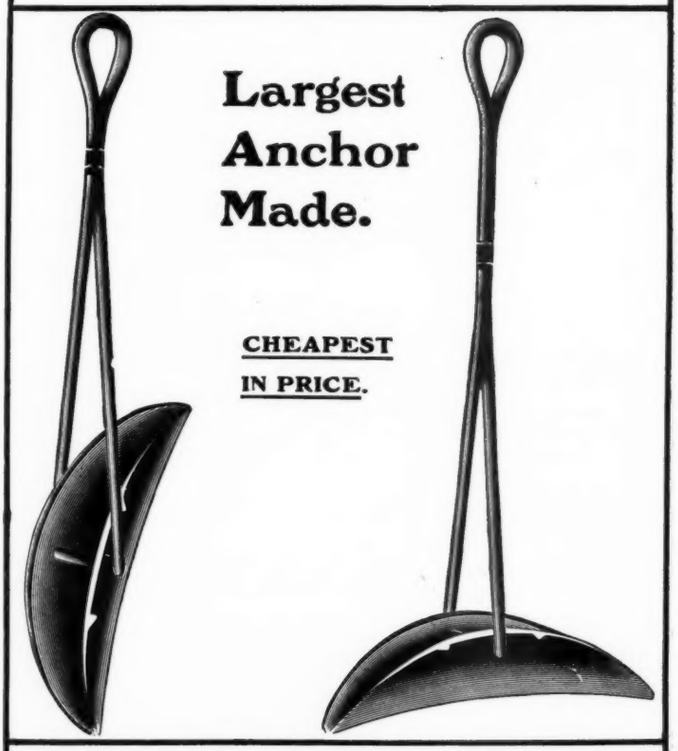
# Screwless

Protector and Distributing Board.

The most wonderful piece of Telephone Equipment of the Twentieth Century.

**Fisk-Newhall Telephone Mfg. Co., :: :: Chicago**

# "THEY NEVER PULL UP"



**Largest Anchor Made.**

**CHEAPEST IN PRICE.**

**MILLER ANCHOR CO., Norwalk, O.**

# THE ELECTRICAL SHOW

TO BE GIVEN BY

## The Electrical Trades Exposition Company

AT THE

## COLISEUM, CHICAGO

## January 15 to 27, 1906

Is now an assured success. Over 20,000 square feet of floor space has already been sold, and large as the Coliseum is, there will not be room enough for all who desire to exhibit. In order to secure any space application should be made at once to Thomas R. Mercein, General Manager, Monadnock Block, Chicago. It is estimated the attendance will be over 200,000.

**The Officers of the Electrical Trades Exposition Company are:**

SAMUEL INSULL, President
E. B. ELLICOTT, CHARLES E. GREGORY,
E. B. OVERSHINER, Vice - Presidents
JOHN J. ABBOTT, Treasurer
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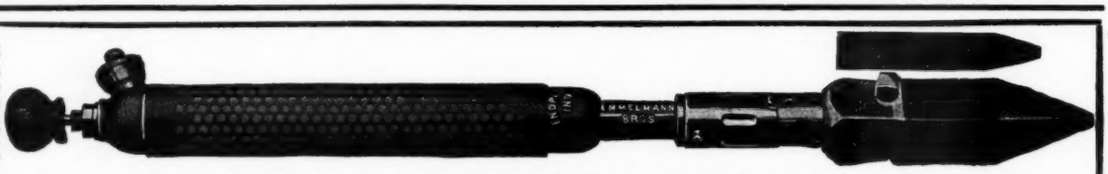

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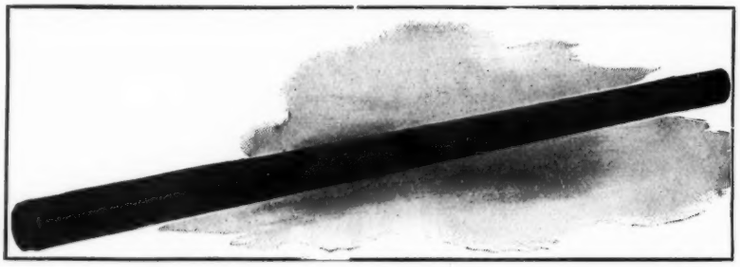
## For Underground Construction



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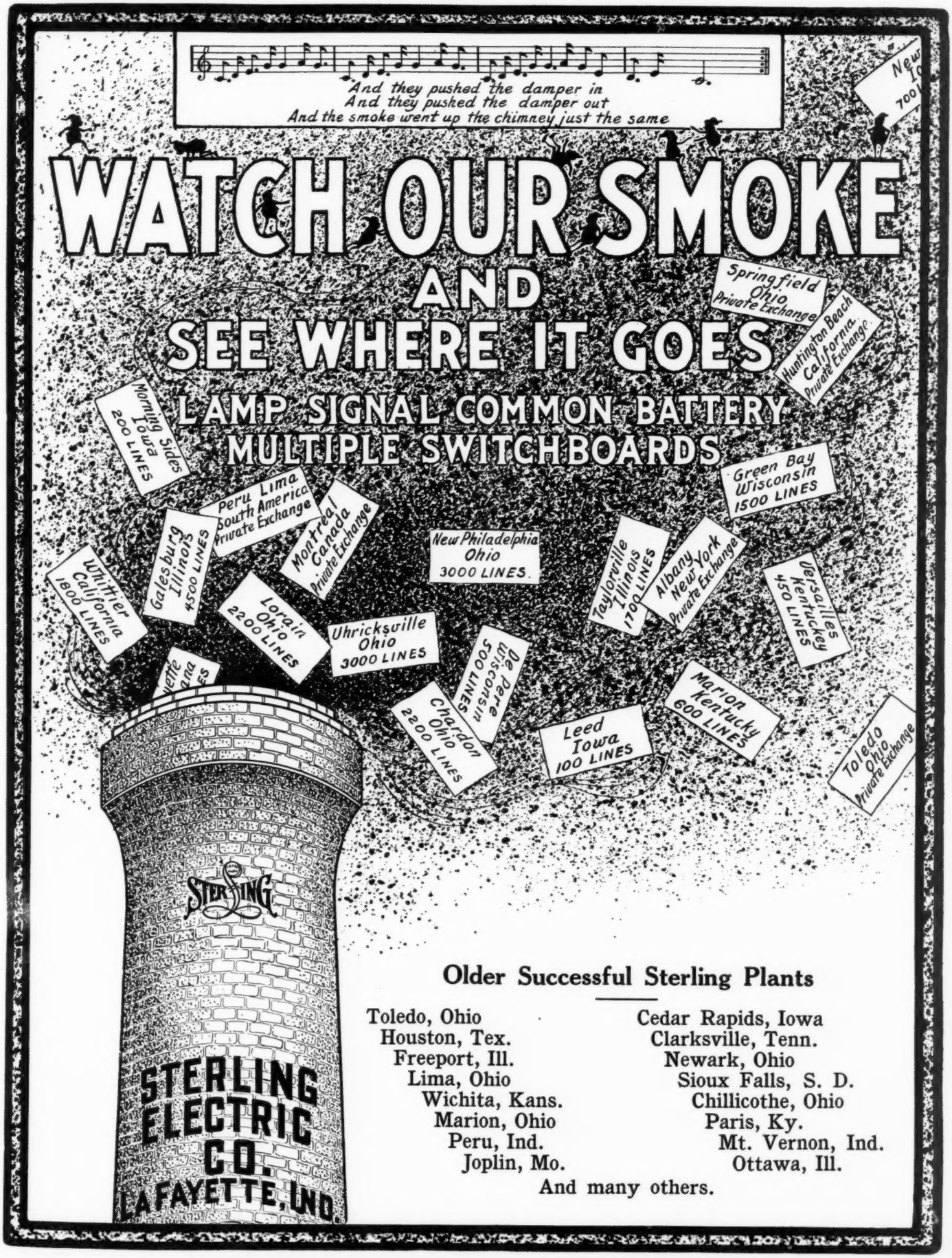
And they pushed the damper in
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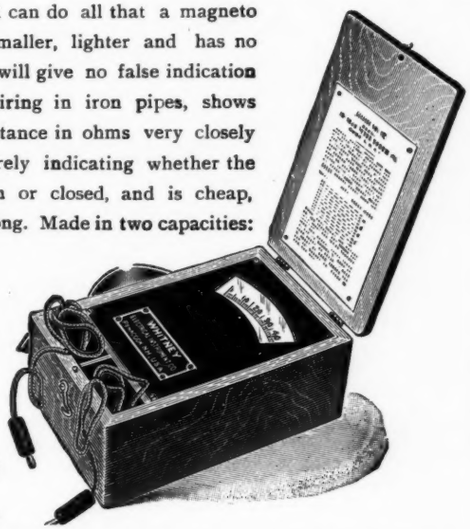

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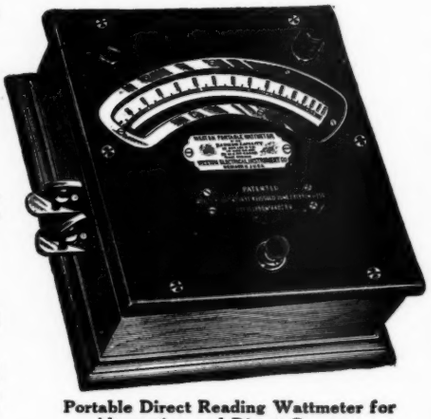

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We cut poles from lands owned by our Company in Northern Michigan on Lake Superior Shore, where the cedar is very **sound** and **stocky** with **heavy butts.**

All sizes in stock all the year round.

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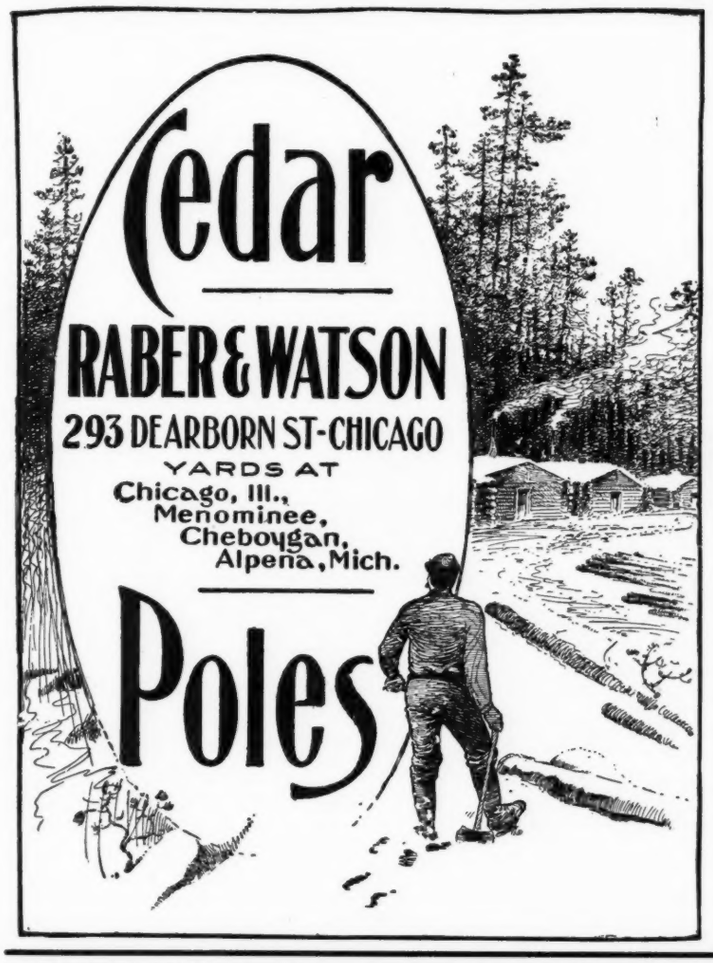


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***All Sizes Large Stock Low Prices***
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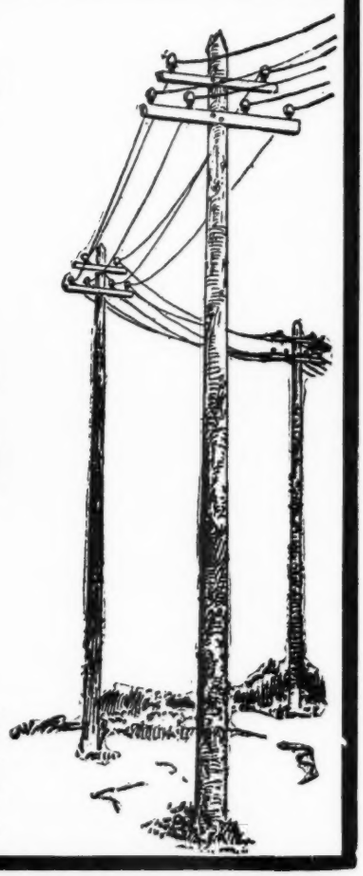

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Immediate shipment — Seven distributing yards
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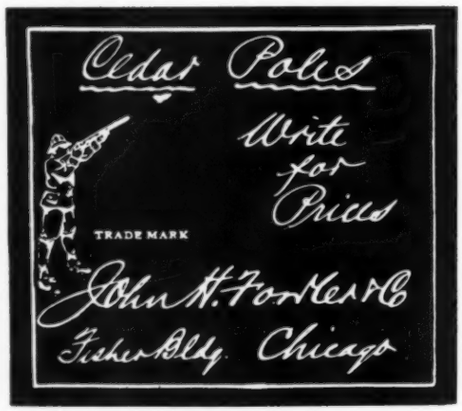


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By George Walker Wilder, Ph.D.

Professor in Telephony in the Armour Institute of Technology.

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Together with our own large stock we are prepared to fill any size Pole Order at once. Sorting and shipping yards all thru Michigan. Michigan White Cedar outlasts any wood. WE MAKE A SPECIALTY OF MICHIGAN CEDAR.

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Made by continuous process from the best Rods obtainable. Possesses great Strength and high conductivity. Pliable, yet tough and uniform.

**GUARANTEED STANDARD**

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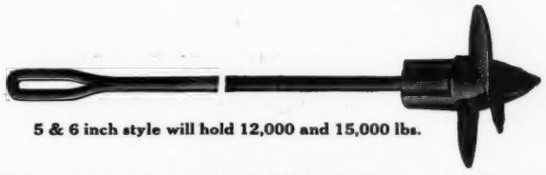

**5 & 6 inch style will hold 12,000 and 15,000 lbs.**

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| 6 " | 20 " | " | 7 " | 35 " | " |
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| 5 " | 25 " | " | 7 " | 40 " | " |
| 6 " | 25 " | " | 8 " | 40 " | " |
| 7 " | 25 " | " | 7 " | 45 " | " |
| 5 " | 30 " | " | 8 " | 45 " | " |
| 6 " | 30 " | " | 7 " | 50 " | " |
| 7 " | 30 " | " | 7 " | 55 " | " |

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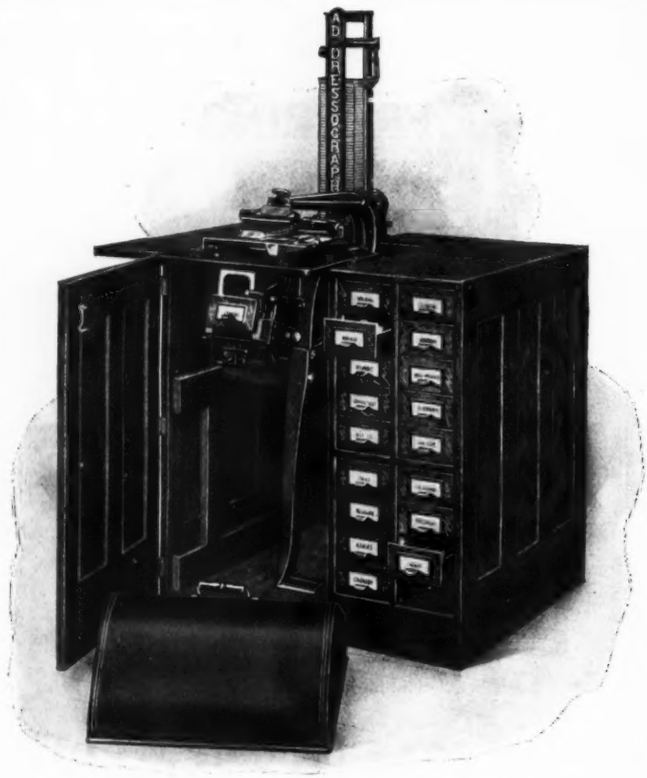


Prints 3,000 addresses (fac-simile of typewriting) per hour on anything.
NEW NAMES AND CHANGES—1c EACH.

# The Card-Index Addressograph

is a combined addressing machine and card-index with reference cards, and guides or tabs for subdividing.

**A Perfect Addressing Machine** using indestructible metal printing plates or rubber type.

**The Address Plates** are fed into the machine without handling, a drawer at a time, and after printing automatically return to the same drawer without disturbing their arrangement.

**20,000 MACHINES IN USE.**

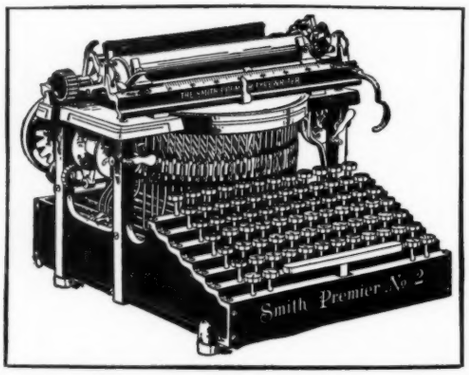
**Operating** Telephone Companies use it for their monthly bills.
**Manufacturers** of Telephones and Apparatus in the advertising department for circularizing.

*Write for catalogue.*

## Addressograph Company,

232-234-236-238-240 W. Van Buren St.
Dept. C.-I. CHICAGO.

# There Must Be Some Advantage




## 300,000 use

# THE SMITH PREMIER

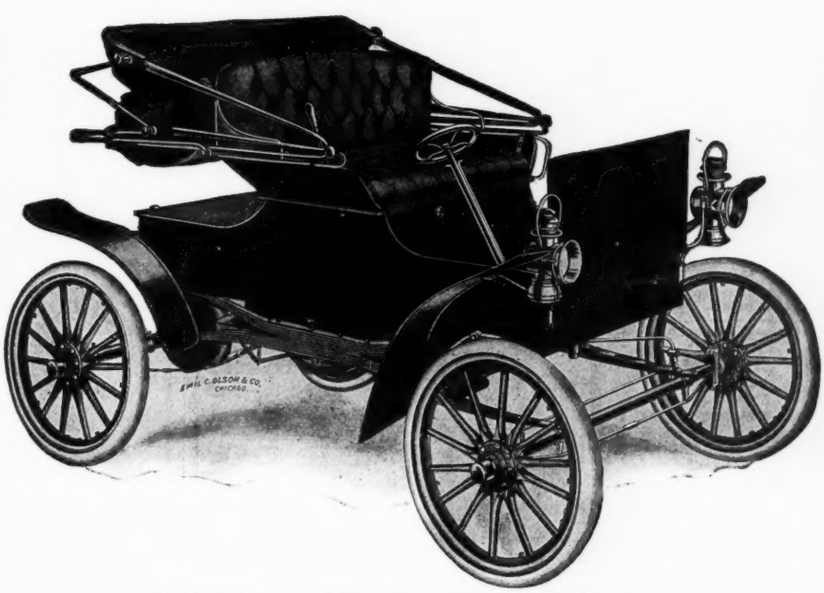
**BRANCH STORES EVERYWHERE**

**Home Office and Factory, Syracuse, N. Y., U. S. A. Chicago Branch, 265 Wabash Ave.**

# MONARCH AUTOMOBILES

**The equipment of a telephone company is never complete until a Monarch Automobile is included. The economy of owning a vehicle such as the Monarch Automobile, will appeal to aggressive management when the many points of excellence are considered. Careful attention is invited to some of the advantages.**

1. Passenger riding on separate springs, which does away with jolting when riding over rough roads.
2. Our vehicle is of seven horsepower (actual); air-cooled engine, the advantages of which are that there is no water to freeze during cold weather and simplifies the mechanism.
3. Our vehicle is so simple that a child can operate it. Our Monarch Cushion Tire, which does not require inflating and is guaranteed absolutely puncture proof, has the same resiliency as a pneumatic tire, thus doing away with all mishaps in the shape of punctured tires.
4. We absolutely guarantee our cooling system under all conditions. On an actual test our engine has run constantly for twenty-four hours on a testing stand without overheating.
5. Speed can be regulated from four to twenty-two miles per hour on the high clutch.
6. Our company has placed on the market a high-class vehicle at a low figure, and which is guaranteed as to structural strength and from all mechanical defects.
7. Has the stylish appearance of an electric runabout and the advantages of a gasoline propelled and air-cooled engine.
8. Monarch Muffler renders engine practically noiseless.
9. The extreme simplicity of every detail, the beauty of design, the high-class material and workmanship make the Monarch the ideal automobile.
10. Either wheel or lever steer.



**Model C, Season of 1906, are now ready for delivery.**

**Price of Runabout, without top, $500.** **Price of Runabout, with top, $550.**

**WRITE FOR DESCRIPTIVE MATTER.**

## MONARCH AUTOMOBILE CO.

### AURORA, ILLINOIS.

AGENTS

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JOSEPH S. HELLER, 1779 Broadway, New York City.

VICTOR L. KRAFT, 44 N. Water Street, Rochester, N. Y.

D. L. MULFORD, 514 N. Broad Street, Philadelphia, Pa.

AUTO SUPPLY AND STORAGE CO., 1416 Madison Ave., Baltimore, Md.

UPTON FUNK, Shippensburg, Pa.

FRED K. MARTEIN, Perth Amboy, N. J.

OHIO PAIL CO., Middlefield, Ohio.

UNION AUTOMOBILE CO., 4601 Olive Street, St. Louis, Mo.

CARL W. HAYS, Lexington, Mo.

HAYDEN AUTOMOBILE CO., 1337 Michigan Ave., Chicago, Ill.

GAGE BROTHERS, Lakefield, Minn

A. W. PETERSEN, 320 W. Third Street, Davenport, Ia.

MOORE AUTO CO., Lincoln, Neb.

GEORGE E. BARTOO, 409 First Ave., Spokane, Wash.

Please tell the Advertiser you saw his Announcement in TELEPHONY.

## CLASSIFIED ADVERTISEMENTS

**And want advertisements not exceeding twenty words exclusive of address, will be inserted in these columns for $1,00 each If over twenty words the rate will be 5 cents per word.**

WANTED—By a large telephone and switchboard factory, several young men not over twenty-two years of age to enter its apprenticeship course, where they will be trained to install and operate large modern telephone switchboards. Address stating age, experience and education, No. 322, care TELEPHONY.

WANTED—Is your service satisfactory? If not, I can make it so without increasing operating expenses. At liberty after January 15th, 1906. Economical, good habits and a stayer. Address No. 323, care TELEPHONY.

FOR SALE—Telephone backboards, cheap for cash. Send for list and prices if you want a bargain. Address, Standard Telephone & Elec. Co., Box 1248, Milwaukee, Wis.

FOR SALE—Telephone exchange at Sheridan, Wis. All lines metallic and in fine shape. Good chance to enlarge it. No incumbrances. Send for information. Address Standard Telo. & Elec. Co., Box 1248, Milwaukee, Wis.

TELEPHONE ENGINEERS—Engineers of experience with telephone manufacturers will gain information to their interest by writing to Box 1732, General P. O., New York City, in regard to business openings. State nature of present work and name of employer as well as age, experience and salary expected.

WANTED—Position as manager or superintendent by experienced all-around man, experienced in all branches of telephone work from ground man to general manager. Present position general manager. Address 319, care TELEPHONY.

WANTED—Position as wire chief in plant of 800 up. Common battery or magneto, anywhere in U. S. I. C. S. student. References furnished. Address 1 Centennial Ave., Brockport, N. Y.

WANTED—Position by first-class telephone inspector and repair man. Best of references; six years' experience; wants change in location. Address 320, care TELEPHONY.


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**CROSELMIRE & ACKOR CO.**

Chicago Office, 1214 Chicago Stock Exchange Bldg. Tel. Main 3924

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**FIBRE** For Telephone and Electrical Insulation
Sheets, Rods, Tubes and Finished Shapes

**DELAWARE HARD FIBRE CO.**

FACTORY: Wilmington, Del. Tel. Main 3924

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THE next electrical storm may cause destruction to your telephone or do other serious damage.

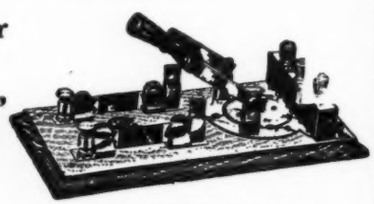
An ounce of prevention is worth a pound of cure.

**Be Easy; No Danger**

if you have a

**"TORNQUIST"**

King of Protectors



ORDER NOW THOUSANDS SOLD

**TORNQUIST ELECTRICAL MFG. CO.**

409-411 West 4th Street, -:- -:- DAVENPORT, IOWA

EMPIRE ELECTRIC SUPPLY CO., Chicago Agents.

# CHRISTMAS, 1905

## CAN BE MADE MEMORABLE IN YOUR EXCHANGE

**Our handsome Filing Cabinets and Office Furniture will make you and your employees happy the year around.**

**Why no treat yourself and your company to a gift worth while?**

**Here is something both handsome and useful—in fact, almost indespensable.**

**Drawers for Letters, Cards, Catalogues, Daily Reports, Circulars, etc. Especially adapted to telephone purposes.**

ILLUSTRATION No. 34

**Above is but one of many different types we make. Better write and get our complete catalogue, then ask us for quotations on any combination you may select. :-: :-: We also make desks.**

**RAILWAY COMMERCIAL CABINET & FILE CO.**

309 Michigan Avenue CHICAGO, ILL.

(Cut off and mail)

**INQUIRY BLANK**

Railway Commercial Cabinet & File Co., Chicago.
Gentlemen:—Please send us your latest catalogue on Filing Cabinets, Office Systems, Desks, etc., as advertised in December TELEPHONY.

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Address.....

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ALL TEMPERS
BRASS DRILL ROD
German Silver, Brass and Copper **WIRE**
BRAZED and SEAMLESS TUBING

***The Plume & Atwood Mfg. Co.***
***199 Lake Street, Chicago***

**CABINETS CABINETS CABINETS**
**Churchill Cabinet Co.**
Leading Manufacturers
Superior Telephone Cabinets
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SEND FOR SPECIAL PRICES

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Manufactured and for Sale by
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Newcomer-Manry Co., Atlanta, Ga.
American Elec. Supply Co., Chicago.
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**THE LA SALLE DRY BATTERY**

Has Absolute Uniformity.
Materials Chemically Pure and of Highest Quality.
Extreme Care Exercised in its Manufacture.
Twenty-seven Years of Experience are Represented in the Production of the
**LA SALLE DRY BATTERY.**
This is not a flash battery but one designed for long life and highest efficiency. A trial order of one barrel (100) of these batteries will prove all of our claims to your entire satisfaction
TELEPHONE COMPANIES
TRY US. YOU CAN'T LOSE
**La Salle Electric Company,**
47 W. LAKE STREET, :: CHICAGO, ILL.

*Crowe Name Plate & Engraving Co.*
CHICAGO
The only manufacturers on earth making
**Name Plates Exclusively.**
WRITE FOR CATALOGUE AND PRICES.

WE MANUFACTURE EVERYTHING IN
**Woodwork for Telephone Companies**
TELEPHONE & SWITCHBOARD CABINETS A SPECIALTY
Write for Prices.
**Telephone Woodworking Co.**
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ENGINEERS--CONTRACTORS
Telephone Engineering and Construction
Meritorious Independent Telephone Enterprises Financed
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The only machine in the world capable of recording the ACTUAL TIME a Telephone Toll Line is in use.
LET US TELL YOU ABOUT IT
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By THOMAS CONYNGTON of the New York Bar
Two practical books for officers of corporations and others interested. The standard works of their kind. Used by the best managed corporations of the country. Prepaid price, buckram, $2.70 each, or both for $5.25; in sheep $3.20 each, both $6.25. Specimen pages, etc., on request.
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For Telephone Exchange and Toll Line Accounting
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# AMERICAN ELECTRIC TELEPHONE CO., Chicago

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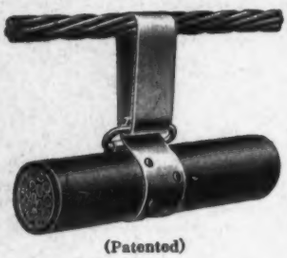
" " 14—Line Material and Supplies.
Bulletin No. 15—Bell Express Self-Restoring Switchboards.
" " 16—Operator's Set and Accessories.
" " 17—Parts of Apparatus.
" " 18—Magneto Telephones of all kinds
" " 19—Central Energy Switchboards.
" " 20—Central Energy Telephones.
" " 21—Protective Apparatus and Terminal Equipment.
Bulletin No. 22—Construction of Country Telephone Lines.
" " 23—Eight-Party Selective Ringing Telephones.
" " 24—Composite Telephone and Telegraph Lines.
" " 25—Four-Party "Leich" Selective Telephone System.
" " 26—Telephone Power and Ringing Equipment.

WE SEND THEM POSTPAID. WRITE FOR THEM.



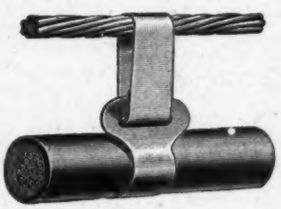
(Patented)

## Metropolitan Cable Clips, Type "A"

This is the standard cable hanger for some of the largest telephone companies in the United States. It has been thoroughly tried out, and there is an increasing demand every year for this splendid cable hanger. It is strong, it is durable and will hold your cable securely under the most severe weather conditions.

## Type "B"

Type "B" is a modification of type "A." It appeals to the telephone Superintendent who has to contend with severe climatic conditions, and who desires to use an all zinc hanger. This clip is easy to apply, and difficult to detach. The price is right. You can no longer afford to use marline, when you can get this hanger at our new quotations. Write for samples and try them.



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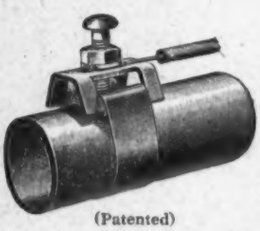

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## New York Ground Clamp

For connecting ground wires to pipes or cables. Cheaper than a wrapped connection, as good as a soldered connection Does not injure the pipe. Can be applied quickly. Adopted by nearly all the largest telephone companies in the U. S. Place a few in the hands of your instrument men. They will like them, as well as your engineers. Write for free sample and catalogue.

## Yonkers Specialty Co., Yonkers, N.Y.

Western Electric Co., Agents

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For particulars address,

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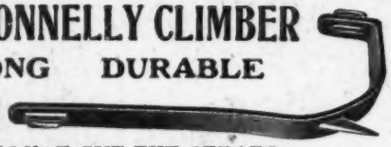
## The Celebrated DONNELLY CLIMBER

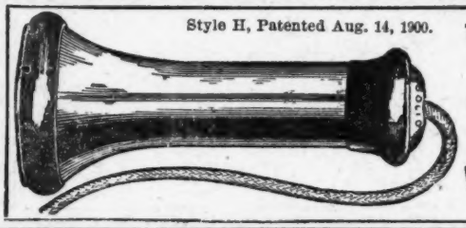
LIGHT STRONG DURABLE

And so bent as to make them particularly easy to work with.



OUR LOOP DOES NOT CUT THE STRAPS.

THE BLAKESLEE FORGING CO., Plantsville, Conn.



Style H, Patented Aug. 14, 1900.

The Handsomest and Best Telephone Receiver Made.

TRADE

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MARK

Wm. J. Murdock & Co.,
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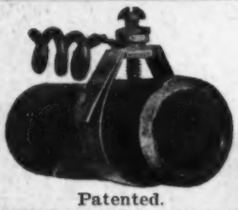

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The Blackburn Ground Wire Clamp

is the BEST and CHEAPEST Clamp on the market.

Write to-day for sample and prices.

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All We Ask is Your Request for Samples and Quotations.

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